

JOINT INTEROPERABILITY ENGINEERING ORGANIZATION

Software Requirements Specification SRS 1-96

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SOFTWARE REQUIREMENTS SPECIFICATION
FOR THE
STATUS OF RESOURCES AND TRAINING SYSTEM (SORTS)

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ABSTRACT

This Software Requirement Specification (SRS) describes the Status of Resources and Training System (SORTS) requirements and the determinants that will be used to measure the level of qualification of each requirement. It also provides traceability between the requirements and the system or subsystem requirement that they address.

The major sections of this SRS include Requirements (Section 3), Qualification Provisions (Section 4), and Requirements Traceability (Section 5).

This specification supersedes the ***Status of Resources and Training System Modernization (SORTS-M) System Specification (JDSSC SPM SS 179-90), dated 18 June 1990.***

SECTION 1. SCOPE

This section of the Software Requirements Specification (SRS) provides identification information, an overview of the Status of Resources and Training System (SORTS) software, and an overview of this specification.

1.1 Identification

This SRS provides the specification of functional and non-functional requirements that will be used to determine the qualification level and viability of the SORTS software. These requirements are applicable to the following subsystems:

- a. User Interface
- b. Database Processing
- c. Application Interfaces
- d. System Utilities.

1.2 System Overview

SORTS is an automated, integrated system that provides decision-makers with dependable, accurate information about the status, location, and readiness of United States military forces throughout the world. Its primary purpose is to provide Commanders with the ability to completely configure their military assets in order to support the requirements of the Joint Services, consistent with the national security plans and Department of Defense (DoD) policy. Global SORTS (GSORTS) provides a graphical user interface (GUI) for accessing, retrieving, and processing information from the SORTS relational database.

The military units submit United States Message Text Format (USMTF) transactions at scheduled intervals. These transactions provide up-to-date data on existing units that SORTS processes into useful, and often vital information. Units can be registered, deleted, or modified through SORTS.

A registered unit (a military organization that has been assigned an identification code) is the source of SORTS database information. The unit status report consists of data items such as

location, status, personnel strength, and category levels of resources, training, and personnel.

Users can access the SORTS database by manipulating on-screen map projections, executing sophisticated database queries, and consulting regularly produced reports. As complements to these mapping and retrieval capabilities, SORTS provides several utility functions that include a text editor, an overlay capability, reference look up capabilities, and location and distance information.

Command level authorities use SORTS to obtain basic unit identities, locations, and the status of equipment/personnel for Armed Forces units and related organizations. For these users, SORTS provides several different types of information:

- a. Basic information about each registered unit of the Armed Forces of the United States and each organization of any other foreign or domestic registered agency.
- b. The status of registered units of Armed Forces and of registered organizations of other nations involved with operation plans.
- c. Information about registered organizations to the Chiefs of the Services, Commanders of Combatant Commands, and Major Commands, including separate operation agencies and Commander-in-Chief (CINC) component commands.

Additional retrieval options available to SORTS users include:

- a. Standard Retrievals/Questions
- b. User-Defined Standard Retrievals/Questions
- c. Ad Hoc Retrievals/Questions
- d. Reference Table Retrievals/Questions.

SORTS has been designed to be as flexible and adaptable as possible. Stored information can be retrieved from the database in various user-defined formats. This approach is very responsive to user retrieval requirements as they arise.

GSORTS evolved from the mainframe-based SORTS, which operated in the Worldwide Military Command and Control System (WWMCCS) to a

client/server network environment, operating within the Global Command and Control System (GCCS).

GSORTS was designed and developed to meet the needs of GCCS users and is fielded to operate on the Sun Scalable Processor Architecture (SPARC) platform.

1.3 Document Overview

This section provides the purpose and content description of this specification.

1.3.1 Purpose. This specification has been developed to provide a comprehensive, formal means of establishing functional and non-functional requirements for all SORTS software releases and versions. The SRS is designed to address the following objectives:

- a. Establish a comprehensive means of evaluating SORTS software releases and versions to ensure complete verification and validation of all SORTS requirements.
- b. Provide minimum acceptability levels and performance requirements for various components used in development, testing, and operational configurations.
- c. Establish the basis for the design and qualification testing activities for the SORTS software and database.
- d. Provide sufficient information to testing personnel to aid in determining the completeness and effectiveness of planned testing activities.
- e. Provide a means of verifying that the SORTS software and database adequately satisfies specified user requirements.
- f. Provide a formal reference for software maintenance personnel to ensure on-going compliance with stated requirements throughout the software life cycle.

1.3.2 Content Description. This SRS establishes the complete list of SORTS requirements (functional, interface, performance, qualification, etc.). It includes requirements for software design, adaptation, quality factors, and traceability, as well as delivery preparation and ancillary notes, such as references, terms, and abbreviations.

Section 3 provides a description of the functional and non-functional requirements and characteristics of the SORTS subsystems that are used to evaluate the level of their acceptability and qualification.

The requirements presented throughout this specification have been labelled with a SORTS project-unique identifier (PUI). The PUI utilized in this document, formulated as "XXX-N.YYY", is interpreted as follows:

- a. "XXX" is used to indicate a functional or related group of requirements, "XXX" is defined as follows:

- REQ Requirement
 - CAP Capability
 - RIN Internal Interface
 - INT External Interface
 - DAT Internal Data Requirements

- b. "N" indicates the SORTS subsystem that the stated requirement is associated with. (Not all PUI will contain "N") "N" is defined as follows:

- 1 User Interface
 - 2 Database Processing
 - 3 Application Interfaces
 - 4 System Utilities

- c. "YYY" is a sequential numbering of requirements that have been mapped to a SORTS subsystem, beginning with '001'. Use of this sequential number is only used when more than one requirement exists in a particular group, for the same referenced subsystem.

Section 4 describes qualification methods, and specifies for each functional requirement in Section 3, the criteria that are used to ensure that the qualification is satisfied.

Section 5 provides traceability information from the functional requirements in this specification to the system or subsystem, as applicable, that they address.

Section 6 provides a descriptive list of acronyms and abbreviations that are used or referenced in this SRS in addition to any general information that aids in its understanding.

SECTION 2. REFERENCED DOCUMENTS

This section provides a listing of the applicable documents referenced in this SRS. Both Government and non-Government documents are addressed:

- a. Chairman of the Joint Chiefs of Staff (CJCS), Release Procedures for Joint Staff and Joint Papers and Information, CJCS Instruction (CJCSI) 5714.01, Washington, DC, 29 Apr 94
- b. CJCS, Status of Resources and Training System (SORTS), Memorandum of Policy (MOP) 11, Washington, DC, 16 Mar 90; Change 1, 24 Dec 92
- c. Defense Information System Network, Secret Internet Protocol Router Network (SIPRNET), Internet Protocol Addressing Plan, Reston, VA, 24 Nov 94
- d. Defense Systems Support Organization (DSSO), Documentation Standards and Publications Style Manual, Procedures Manual (PM) 1-91, Washington, DC, 1 Jun 91
- e. DSSO, Global Status of Resources and Training System (GSORTS) Force Resources Assessment Subsystem (FRAS) Users Manual, Users Manual (UM) 20-91, Washington, DC, 28 Apr 95 (unpublished)
- f. DSSO, Procedures and Guidelines for Software Testing, Procedures Manual (PM) 5-91, Washington, DC, 1 Oct 91 (draft)
- g. DSSO, Standards and Procedures for Software Projects, Procedures Manual (PM) 2-92, Washington, DC, 27 Feb 92
- h. DSSO, SORTS Administrator Guide, Technical Memorandum (TM) 419-92, Washington, DC, 1 Oct 92; Change 1, 4 Nov 92; Change 2, 5 Aug 94
- i. DSSO, Status of Resources and Training System (SORTS) Version 6.0 Database Specification, Database Specification (DS) 1-92, Washington, DC, 18 Sep 92; Change 1, 15 Sep 94; Change 2, 30 Jun 95

- j. Department of Defense (DoD), Defense System Software Quality Program, Department of Defense Standard DoD-STD-2168, Washington, DC, 29 Apr 88
- k. DoD, Security Requirements for Automatic Data Processing (ADP) Systems, Department of Defense Standard DoD-STD-5200.28, Washington, DC, 21 Mar 88
- l. Jet Propulsion Laboratory (JPL), GCCS Automated Message Handling System Application Programming Interface, JPL D-12731, Pasadena, CA, 11 Jul 95 (draft)
- m. Joint Data Systems Support Center (JDSSC), PLNREC Process Computer Operation Manual, Operation Manual (OM) 1-91, Washington, DC, 4 Mar 91
- n. JDSSC, Status of Resources and Training (SORTS) Modernization, Functional Description (FD), Washington, DC, 15 May 88 (draft)
- o. JDSSC, System Design Document for the Status of Resources and Training System (SORTS) Modernization, System/Segment Design Document (SSDD) 1-90, Washington, DC, 7 Dec 90 (unpublished)
- p. Joint Interoperability Engineering Organization (JIEO), Common Warfighting Symbolology, Version 1, Military Standard MIL-SRS-2525, Reston, VA, 30 Sep 94
- q. JIEO, GCCS Common Operating Environment Baseline, Sterling, VA, 28 Nov 94
- r. JIEO, Global Command and Control System Integration Standard, Version 1.0, Sterling, VA, 26 Oct 94
- s. JIEO, Global Status of Resources and Training System (GSORTS) Version 1.0 User's Guide, Sterling, VA, 19 Aug 94; Change 1, 30 Jun 95
- t. JIEO, Implementation Procedures Documentation for Automated Information Systems Revision 4, GCCS Version 2.1 (GCCS-GIP-2.1), Sterling, VA, 14 Sep 95
- u. JIEO, Joint User Handbook for Message Text Formats (JUH-MTF), Revision 5.2, JIEO Handbook (JIEOH) 9000, Sterling, VA, 1 Oct 92

- v. JIEO, Software Development Plan for the Status of Resources and Training System (SORTS), Software Development Plan (SDP) 3-96, Washington, DC, 8 Mar 1996
- w. JIEO, Software Product Specification for the Global Command and Control System (GCCS) Status of Resources and Training System (GSORTS), Software Product Specification (SPS) 2-95 (Revised), Washington, DC, 30 Jun 95
- x. JIEO, Standard Operating Procedures (SOP) for the Sun, WWS, and Datawatch Platforms at Alarm 28 and Remote Sites, Volumes I & II, Washington, DC, 22 May 95 (unpublished)
- y. JIEO, SORTS/GSORTS Software Standards and Procedures Manual (SSPM), Technical Memorandum (TM 446-94), Washington, DC, 23 Sep 94
- z. JIEO, System Administrative Manual Revision 2, GCCS Version 2.1 (GCCS-SAM-2.1), Sterling, VA, 7 Aug 95 (draft)
- aa. JIEO, User Interface Specifications for the Global Command and Control System (GCCS), Version 1.0, Sterling, VA, Oct 94 (draft)
- ab. Joint Information Service Center (JISC), Computer System Operator's Manual for the Status of Resources and Training System, Computer System Operator's Manual (CSOM) 1-94, Washington, DC, 19 Aug 94; Change 1, 30 Jun 95
- ac. JISC, Crisis Management ADP System (CMAS) and Global Status of Training and Resources System (GSORTS) Data Connection Implementation Plan, Washington, DC, 16 Dec 93 (unpublished)
- ad. JISC, Project Metrics Handbook, Procedures Manual (PM) 4-94, Washington, DC, 17 Aug 94
- ae. JISC, Project Status Reports and Reviews Handbook, Procedures Manual (PM) 86-94, Washington, DC, 28 May 94
- af. JISC, SORTS/GSORTS Software Standards and Procedures Manual, Technical Memorandum (TM) 446-94, Washington, DC, 23 Sep 94

- ag. Joint Staff (JS), Joint Reporting Structure Status of Resources and Training System (SORTS), Joint Publication (PUB) 1-03.3, Washington, DC, 10 Aug 93
- ah. JS, U.S. Message Text Formatting Program, Joint Publication (PUB) 6-04.20, Washington, DC, 1 Oct 92
- ai. Office of the Assistant Secretary of Defense Command, Control, Communications, and Intelligence (ASD(C³I)), Data Element Standardization Procedures, Department of Defense (DoD) Manual 8320.1-M-1, Washington, DC, Jan 93
- aj. Office of the Secretary of Defense (OSD), Configuration Management, Military Standard MIL-STD-973, Washington, DC, 17 Apr 92, Change 1, 1 Dec 92
- ak. Space and Naval Warfare Systems Command, Joint Operational Tactical System JOTSII 2.0 Unified Build User's Guide, Volume 1, 15 July 94
- al. United States Air Force (USAF), Engineering Management, Military Standard MIL-STD-499A, Washington, DC, 1 May 74
- am. USAF, Military Standard Diskette Message File Formats for Defense Messaging, Military Standard MIL-STD-1832, Scott AFB, IL, 15 Mar 91
- an. USAF, Specification Practices, Military Standard MIL-STD-490A, Washington, DC, 4 Jun 85
- ao. USAF, Technical Reviews and Audits for Systems, Equipments, and Computer Software, Military Standard MIL-STD-1521B, Washington, DC, 5 Jun 85; Change 1, 19 Dec 85; Change 2, 17 Jul 92
- ap. United States Navy (USN), Software Development and Documentation, Military Standard MIL-STD-498, Alexandria, VA, 5 Dec 94
- aq. USN, Software Requirement Specification, Data Item Description (DID) DI-IPSC-81433, Alexandria, VA, 5 Dec 94.

SECTION 3. REQUIREMENTS

This section specifies the requirements of SORTS. It highlights the characteristics of the SORTS subsystems that are used to evaluate the level of their acceptability and qualification.

3.1 Required States and Modes (REQ-01)

GSORTS evolved from WIS Workstation (WWS)-based SORTS v6.x client-server architecture which operated in the Worldwide Military Command and Control System (WWMCCS). SORTS v6.x in turn had evolved from the SORTS v5.2 application, which operated in the WWMCCS mainframe environment. GSORTS was developed to operate in a client-server network environment within the Global Command and Control System (GCCS) to meet the needs of GCCS users. In this regard, it is required that SORTS maintains the capability to operate in a client-server mode in addition to a stand-alone mode. Within these modes, SORTS is required to provide functional capabilities associated with various states which includes user interface support, graphical data representation and manipulation, and database query and update processing.

Reference section 3.9 and 3.10, respectively for specific environment and computer resource requirements associated with the operation of SORTS on the SPARC and WWS platforms.

3.2 Capability Requirements

The capability requirements for the SORTS subsystems are identified in the following sections.

3.2.1 User Interface Subsystem. The purpose of SORTS is to provide decision-makers with dependable, accurate information pertaining to the status, location, and readiness of United States military personnel, equipment and related organizations throughout the world. It is intended to provide Commanders with the ability to completely configure their military assets in order to support the requirements of the Joint Chiefs of Staff (JCS) and National Command Authorities (NCA), consistent with national security plans and DoD policy. The main goal of GSORTS application is to provide a graphical user interface (GUI) for accessing, retrieving, and processing such information from the SORTS database.

3.2.1.1 GUI Capability Requirements (CAP-1.01). The Graphical User Interface (GUI) capability allows users to access the SORTS

database through SORTS/GSORTS by manipulating on-screen map projections, making queries, or reviewing associated reports via an interactive windows-based menu process. This capability is designed to consider the needs, experience and capabilities of the system users. The SORTS/GSORTS interactive GUI capability is characterized by the following requirements:

- a. Is based on the use of iconic (pictorial) representations of entities, pull-down or pop-up menus, buttons, switches, sliders, and pointing devices which are common-place on computer workstations.
- b. Utilize multiple windows that allow different information to be displayed and acted upon simultaneously on the user's screen. As applicable, it provides the ability to switch from one task to another without losing the information displayed from a previous task.
- c. Utilize fast, full-screen system functional interactions rather than a pure textual command line-oriented interface. Command actions are made via menu selections rather than by a command language.
- d. Incorporate the use of a pointing device (such as a mouse) for selecting menu choices.
- e. Provides the ability to display graphical as well as textual information, and/or a combination thereof.
- f. Provides an ability to create, edit, and delete query files and store them in user-defined directories.
- g. Provides the ability to create, edit, and delete filters (sets of query criteria) for selection of specific elements from the database.
- h. Provides the ability to print a displayed window and/or map.
- i. Provides ability to create, modify, and execute video briefings, automatic update scripts and other recurring scripts, and displays.
- j. Provides a text editor that includes the capability to create, edit, and delete text using standard editing tools

such as, but not limited to move, copy, search, and import text.

- k. Provides viewing of situational information as a series of map overlays.
- l. Provides the capability of viewing retrieved data in text format.
- m. Provides map display capabilities that include text labeling and the ability to modify the scale of the map.
- n. Provides a window to view system messages concerning current retrieval operations.
- o. Provides the capability to select map color, line style, line width, and display scale ranges.
- p. Provides the capability to view and adjust the map projection, map center and map scale.
- q. Provides the capability to Load, open, read, view, close, and release Defense Mapping Agency (DMA) Arc Digital Raster Graphic (ADRG) maps.
- r. Provides the capability to switch the display between vector and DMA ADRG maps.
- s. Provides an ability to magnify and de-magnify map settings for enhancement.
- t. Provides the capability of viewing latitude and longitude position relational to cursor position.
- u. Provides the capability to view longitude and latitude lines on the display screen in relation to displayed map area.
- v. Provides the capability to display only those map symbols that fall within a user-defined, specified radius from a given position.
- w. Provides the capability to view or clear the definition of a circular area to be displayed on the map with input parameters for latitude and longitude, symbol, text, color,

inner ring dimension, outer ring dimension, and incremental rings dimension.

- x. Provides the ability to load and display saved maps contained in a user-defined storage directory.
- y. Provides the capability for a displayed map to be saved to a user-defined storage directory as a new or modified map.
- z. Provides the capability to delete saved maps located in user-defined storage directories.
- aa. Provides the capability to retrieve, display and edit previously stored queries and associated symbols from user-defined directories.
- ab. Provides the capability for all GSORTS queries to be updated using the most current SORTS database information.
- ac. Provides the capability to update user-defined and pre-defined retrievals with current SORTS data while being displayed in a presentation format.
- ad. Provides the capability to design and/or edit retrievals that are displayed in a presentation format.
- ae. Provides the capability to edit pre-existing retrievals and have the data displayed in a presentation format.
- af. Provides a user-friendly method of selecting and executing queries by utilizing menu-driven technology.
- ag. Provides an ability to select labeling fonts.
- ah. Provides an option for the user to readily obtain the date that the SORTS database was last updated.
- ai. Provides a means of accessing classified and unclassified information from various reference sources, such as Janes, Gazetter, and Central Intelligence Agency (CIA) World Facts.
- aj. Provides the capability to create, edit, and delete a specified route from starting point to destination point on a map display.

- ak. Provides the capability of inserting, editing, and deleting a segment of a specified route from starting point to destination point of a map display.
- al. Provides the capability to create, edit, and delete files containing path-of-intended motion (PIM) tracks.
- am. Provides the capability to create, edit, run, and delete files with map tracking symbols and associated information to be used as map overlays.
- an. Provides the capability to view or remove the visual connection between two or more points on a displayed map.
- ao. Provides an option to create, edit, and delete an enclosed area using as many boundary points as necessary to define the area.
- ap. Provides the capability to place text positional data on a map overlay using specific latitude and longitude settings and at any desired location on a map overlay.
- aq. Provides the capability to add, move, and delete location symbols on a displayed map overlay.
- ar. Provides the capability to display saved path-of-intended motion data on a map overlay.
- as. Provides the capability to set and display security classification level on data being displayed.
- at. Provides a user friendly, on-line help option for all GSORTS, SORTS and system functions.
- au. Provides the capability to update a query with new data from the SORTS database.
- av. Provides the capability to edit queries.
- aw. Provides the capability to define the criteria for symbol description displays.
- ax. Provides the capability to display range and bearing information between two points in nautical miles.

- ay. Provides the capability to show a visual line reflecting range and bearing data.
- az. Provides the capability to vary the scale (zoom in, zoom out) of a designated area of the map display.

3.2.1.2 GIQS and SIQS Capability Requirements (CAP-1.02). The Generalized Interactive Query System (GIQS) is a software application that allows users with little knowledge of Structured Query Language (SQL) to create SQL retrievals. GIQS is capable of creating and conducting queries against any database that has been defined to it. GIQS may also be used as a training tool for learning SQL and its associated syntax.

The SORTS Intelligent Query System (SIQS) is a version of GIQS that operates on the WWS. Like its counterpart, GIQS, it is a software application that allow users with little knowledge of SQL to create SQL retrievals. SIQS is also capable of creating and conducting queries against any database that has been defined to it.

The GIQS and SIQS capabilities address the following functional requirements:

- a. Provides the capability to delete all user-defined criteria for a query.
- b. Provides the capability to restore or delete user-defined criteria for the last executed query.
- c. Provides the capability to turn off and on an option that permits executable query commands from a software program outside of SORTS.
- d. Provides the capability to designate an entry point to the database to enable direct and indirect access to various data tables.
- e. Provides the capability to enter or remove military branch unit information for inclusion in query results.
- f. Provides the capability to limit the query results to preset and user specified criteria.
- h. Provides the capability to create, edit, and delete data fields that are to be displayed in a query output.

- i. Provides for an option to omit duplication of data in a query output.
- j. Provides the capability to position and reset to the original position, columns of displayed data in a query output.
- k. Provides an option to use pre-existing output formats as-is or with modification.
- l. Provides the capability to view the results of queries and reports on a monitor.
- m. Provides the capability to generate printed or displayed user requested unit reports.
- n. Provides default storage areas for saved query output and provide the ability to permit the user to designate a different name for that storage area other than the default name.
- o. Provides the ability to formulate the queries as a series of SQL statements and execute the SQL statements against the SORTS database.
- p. Provides the capability to retrieve data based on the results of a query, and write the data to an output file.
- r. Provides the capability to write query statements and/or results to a printer in report format.
- s. Provides the capability to utilize the X-Window SORTS Manager (XSM) and the SORTS Manager (SM) subject help facilities.

3.2.2 Database Processing Subsystem. The SORTS database contains information for registered military units that includes such items as location, status, personnel strength, and category levels of equipment, supplies, training, and personnel. Transactions are submitted to the SORTS database on various schedules to provide current and updated information on the units. Users can access this data through GSORTS/SORTS by manipulating on-screen map projections, making queries, or reviewing associated reports.

3.2.2.1 Database Organization (CAP-2.01). The SORTS database is formulated on the concepts of a Relational Data Base Management

System (RDBMS). The database is specified as a set of tables with related data elements in addition to reference and system validation tables. Each database table contains a key that uniquely identifies a row within a table. The advantage of this approach is that the mapping of the database to commercial off-the-shelf (COTS) relational database management systems is straightforward. SORTS utilizes a RDBMS to satisfy the following requirements:

- a. The use of Oracle as the RDBMS is required in the G SORTS/SORTS environment due to previously specified requirements imposed by DISA (and its predecessors) and in consideration of platforms in use.
- b. SORTS data element labeling and naming conventions are consistent with the standard data elements defined in Joint Pub 1-03.3 and Joint Pub 6-04 series.
- c. Physical design of the database is independent of the hardware platform used in the system configuration.

3.2.2.2 Database Initialization (CAP-2.02). The Database Initialization capabilities address functions that are required to establish the SORTS database, internal tables, and reference structures. The functional requirements associated with this capability are highlighted as follows:

- a. Create and load the database structure with SORTS table descriptions and data.
- b. Create and load the various reference and look-up tables.
- c. Create tables that contain airports information (APORTS), shipping ports information (PORTS), Service-unique data, and data that specifies the military unit type (TUCHA) in Oracle.
- d. Create tables with electronic plain language address designator (PLAD) and unit identification codes and communication (UICCOM) information in Oracle.
- e. Load tables that contain airports information (APORTS), shipping ports information (PORTS), unique Service data, and data that specifies the type of military unit (TUCHA) into the Oracle database.

3.2.2.3 Input Data Preparation (CAP-2.03). The Input Data Preparation capabilities address functions that are required to update the PLAD and UICCOM information, in addition to functions that address the preparation of United States Message Text Format (USMTF) message transactions that are received from the NMCS Automated Control Executive (NACE) system, the Global Command and Control System (GCCS) Automated Message Handling System (AMHS), the WWMCCS Intercomputer Network (WIN) File Transfer Subsystem (FTS), and the Secret Internet Protocol Network (SIPRNET) File Transfer Protocol (FTP) prior to the SORTS database update process. The functional requirements associated with this capability are highlighted as follows:

- a. Provide the ability to update the tables that contain electronic plain language address designator (PLAD) and unit identification codes and communication (UICCOM) information in Oracle.
- b. Provide the ability to prepare transactions that are received via various input sources for database update processing.

3.2.2.4 Update Preprocessing (CAP-2.04). The Update Preprocessing capabilities address functions that are required to process the USMTF messages from NACE, GCCS AMHS, WIN (FTS), and SIPRNET (FTP), perform update preprocessing functions, and prepare the distribution addressee information. The functional requirements associated with this capability are highlighted as follows:

- a. Process USMTF messages through the SORTS Communications Processor (SCP).
- b. Provide the ability to archive previously processed Joint Reporting Structure (JRS) and USMTF messages that have been processed via the SCP.
- c. Process the USMTF (messages that have been processed via the SCP) for distribution to the SORTS community.
- d. Update the electronic distribution addresses (DISTR_ADDR) database table.

3.2.2.5 Update Processing (CAP-2.05). The SORTS database Update Processing capabilities address functions that are required to update the SORTS database. These functions include transaction field and logical association validation, error resolution, and

complete (add, change, delete) database update processing of major database tables and internal structures. The functional requirements associated with this capability are highlighted as follows:

- a. Provide an ability to perform update (add, change, delete) processing on information contained in the SORTS database based on various input transactions in accordance with specific requirements stated in Joint Publication 1-03.3 (reference (ag)).
- b. Perform parameter, transaction field and cross-field validation functions for each update transaction in accordance with specific requirements stated in Joint Publication 1-03.3 (reference (ag)).
- c. Provide meaningful error and exception messages or warnings, as necessary, throughout the database update process.

3.2.2.6 Report and Message Processor (CAP-2.06). The Report and Message Processor (RAMP) capability consists of functions that are used to extract transactions following the database update process and disseminate them to various Commands, determine new and obsolete unit identification codes (UICs) for the creation of RAMP distribution actions, and create a database review file for RAMP processing. The functional requirements associated with the RAMP capability are high-lighted as follows:

- a. Extract transactions from a designated input source and disseminate them to interested Commands.
- b. Determine new and obsolete UICs to facilitate RAMP distribution "deletes" and "dumps" functions.
- c. Provide an ability to create a database review information for RAMP processing.
- d. Provide an ability to assemble header and data information to allow RAMP to produce an appropriate MSGID line in an output message.
- e. Produce error messages and information in the event of adverse processing parameters or results for the RAMP user.

3.2.3 Application Interfaces. The SORTS applications interfaces capability provides a means of direct and indirect communications between SORTS and other external automated systems. These

interface functions includes the import and export of data in requested formats to and from external systems, the ability to use COTS Oracle products to retrieve data from the SORTS database, and the ability to produce segments of the SORTS database on various storage media for multi-operational usage.

3.2.3.1 Joint Operations and Planning Execution System (CAP-3.01). The interface to the Joint Operations and Planning Execution System (JOPES) is required to fulfill processing requirements specified in JS PUB 1-03.3 (reference (ag)). The SORTS/JOPES input process includes functions to extract selected JOPES transaction data from the WWMCCS mainframe computer and format them for processing into the SORTS Operational Planning (OPLAN) database. The SORTS Database Administrator (DBA) is then responsible for determining which operational plan number transactions will be used to generate transactions to the SORTS community.

The SORTS/JOPES output process includes functions to extract selected SORTS data from the SORTS database and to provide the data to JOPES as the input to software routines used to update the JOPES database.

The following functional capabilities are required for the SORTS/JOPES interface:

- a. Provides an ability to produce a JS PUB 1-03.3 specified subset of the JOPES database that consists of specific operational plan numbers to facilitate of input processing requirements.
- b. Produce an ASCII-formatted tape for input into the SORTS database update and distribution process.
- c. Provide an ability to produce a JS PUB 1-03.3 specified subset of the SORTS database for input into JOPES, utilizing date and date range processing parameters.
- d. Produce a Honeywell computer system standard formatted transaction tape.
- e. Provide an ability to access required JOPES database and tables (reference section 3.3.2).

3.2.3.2 Force Augmentation Planning and Execution System (CAP-3.02). The Force Augmentation Planning and Execution System (FAPES) supports the manpower mobilization and execution require-

ments as stated in JS PUB 1-03.3 (reference (ag)). SORTS has the capability to produce a complete FAPES initialization database or only data related to a single Service. The SORTS interface provides an ability to produce the unit, personnel, reserve component, and unit transfer data. The following are SORTS requirements to satisfy the function of the SORTS/FAPES interface:

- a. Produce a Disk Operating System (DOS) file containing unit data for FAPES retrieval.
- b. Provide an ability to create a DOS file containing FAPES requested personnel data.
- c. Provide an ability to create a DOS file containing reserve unit data requested by FAPES.
- d. Provide an ability to create a DOS file which contains unit change-of-duty data requested by FAPES.

3.2.3.3 NMCC Command and Control System (CAP-3.03). The National Military Command Center (NMCC) Command and Control System (NCCS) maintains a composite of the SORTS database and update processing modules on its computer system. A portion of the SORTS database is periodically copied to the NCCS via a direct communications link from the SORTS Master Database platform. The operation of the SORTS/NCCS interface requires that specific data assembly concerns (such as directory and file names) are identical on the SORTS and NCCS computer systems, respectively. Therefore, changes concerning the location (directory, file designation, etc.) of the SORTS database on the SORTS Master Database computer platform, must be coordinated with the appropriate personnel at the NCCS site.

3.2.3.4 Joint Maritime Command Information System (CAP-3.04). The Joint Maritime Command Information System (JMCIS), formerly known as the Joint Operational Tracking System (JOTS), is responsible for monitoring Navy ship movements and broadcasting pertinent message transactions to various computer sites. The DISA SORTS Office (in the Pentagon) receives and processes Over-The-Horizon (OTH) real-time tactical (GOLD formatted) Contact (single position report) message transactions in the SORTS database update process. The JMCIS interface process is capable of operating in automatic, semi-automatic, and manual modes. For the SORTS/JMCIS interface to operate in automatic, semi-automatic, and manual modes, the following SORTS requirements are essential:

- a. Provide an ability to convert the OTH GOLD Contact message data to SORTS compatible format.
- b. Process JMCIS traffic transmission data automatically, on demand, or by using a combination thereof.

3.2.3.5 Defense Manpower Data Center (CAP-3.05). The Defense Manpower Data Center (DMDC) interface is characterized as an indirect interface to SORTS. SORTS SQL*Plus database queries produce data in a specified format and directs the resultant data to a designated output file. The SORTS/DMDC interface requirements are as follows:

- a. Produce a subset of the SORTS database for input to the DMDC.
- b. Provide a mechanism to transport the retrieved data to the DMDC facility.

3.2.3.6 Automated Message Handling System (CAP-3.06). A direct communications link and associated software processes are used to provide an interface between SORTS and the GCCS Automated Message Handling System (AMHS). The functional capabilities include retrieving SORTS incoming transaction messages (from AUTODIN), providing those transactions to the SORTS database update process, producing valid outgoing messages, and verifying the successful transmission of those messages. The SORTS/AMHS interface requirements are as follows:

- a. Define SORTS message delineating criteria to aid in automatic retrieval of AUTODIN message transactions.
- b. Update the SORTS database using the retrieved AUTODIN messages.
- c. Provide an ability to produce outgoing transaction messages and have the messages transmitted via AUTODIN by the AMHS Application Programming Interface (API).

3.2.3.7 NMCS Automated Control Executive (CAP-3.07). The NMCS Automated Control Executive (NACE) provides queues to capture AUTODIN message traffic on the WWMCCS. The NACE traffic is used to update the SORTS database. The message traffic is copied from NACE (resident on the Honeywell Readiness computer system) and converted for manual transfer to the SORTS Master Database platform (at the Pentagon). Within the context of this interface, NACE may be

considered as the message traffic manager. The SORTS/NACE interface requirements are as follows:

- a. Define SORTS message delineating criteria to aid in automatic retrieval of AUTODIN message data from AUTODIN, WIN, workstations, and user processors.
- b. Provide a means of receiving and transmitting AUTODIN messages via NACE.
- c. Provide an ability to transport transaction messages received by NACE from the Honeywell mainframe computer to the SORTS Master Database platform.
- d. Provide an ability to transport transaction messages from the SORTS Master Database platform to the WWMCCS mainframe computer for NACE processing.

3.2.3.8 Joint Spectrum Center (CAP-3.08). The SORTS Joint Spectrum Center (JSC) interface was created to fulfill the SORTS/JSC data interface processing requirement. This process extracts selected data fields on all units in the SORTS database and produces data in a specified JSC record format file. The JSC data is loaded on a tape cartridge in Unix **tar** format and then transported to the JSC destination. The SORTS/JSC interface requires it to provide an ability to create a subset of the SORTS database and write it to an JSC output file on transferable magnetic medium.

3.2.4 System Utilities (CAP-4.00). The SORTS System Utilities subsystem provides the system administrative personnel with tools and functional capabilities to monitor and control various SORTS operations on the supported hardware platforms. These tools are inclusive of functions provided in the SORTS Manager (SM), X-Windows SORTS Manager (XSM), SORTS Communications Processor (SCP), and stand-alone processes to establish, maintain, and reload the SORTS database:

- a. The SORTS Manager (SM) capability addresses the following functional requirements:
 - (1) Provide error audit functions to include the display of UIC and PREP counters, pertinent error information, reports that processed without error, and maintain audit trail data.

- (2) Provide the capability to view the contents of reports being held in an error status.
 - (3) Provide an ability to bump and/or reset UIC counters in addition to an audit trail of reset and bump activities.
 - (4) Provide on-line reference subject and topic information for SORTS database fields and USMTF formats cross-referenced to applicable JRS reporting structures.
 - (5) Provide identifying information regarding messages present in the SCP error queue in addition to a descriptive error reason.
 - (6) Provide processing audit trail capabilities, abilities to manipulate counters, and display, delete and resubmit reports.
 - (7) Display an ability to compute and display SORTS processing statistics.
 - (8) Display disk space, sizes, dates of last access, and other such status information for selected files.
- b. The X-Windows SORTS Manager (XSM) capability addresses the following functional requirements:
- (1) Provide on-line reference subject and topic information for SORTS database fields and USMTF formats cross-referenced to applicable JRS reporting structures.
 - (2) Provide error audit functions to include the display of UIC and PREP counters, pertinent error information, reports that processed without error, and maintain audit trail data.
 - (3) Provide the capability to view the contents of reports being held in an error status.
 - (4) Provide an ability to bump and/or reset UIC counters in addition to an audit trail of reset and bump activities.

- (5) Provide identifying information regarding messages present in the SCP error queue in addition to a descriptive error reason.
 - (6) Provide processing audit trail capabilities, abilities to manipulate counters, and display, delete and resubmit reports.
 - (7) Display an ability to compute and display SORTS processing statistics.
 - (8) Display disk space, sizes, dates of last access, and other such status information for selected files.
 - (9) Obtain UIC, sequence number, and date-time information for a message contained in a user-designated file.
 - (10) Provide an ability to delete selected messages contained in a user-designated file.
 - (11) Provide a capability to selectively retransmit a single message or all messages associated with a given UIC.
 - (12) Provide a capability to selectively retransmit messages in a given sequence number range.
- c. The SORTS Communications Processor (SCP) capability addresses the following functional requirements:
- (1) Provide a capability to designate and receive from an input file raw electronic message traffic.
 - (2) Provide the capability to create multiple logs for tracking messages received and output based on user-defined criteria.
 - (3) Provide a capability to create, save, change, and delete custom format message filters for the purpose of identifying and redirecting messages with format and content errors.
 - (4) Provide a capability to view a synopsis of messages in error along with sufficient information in order to identify the nature of the error.

- (5) Provide a capability to scan the designated input file and automatically bypass duplicate messages encountered.
 - (6) Provide a capability to edit, save, delete, and retransmit messages identified as containing errors.
 - (7) Provide a capability to easily determine if the SCP is currently receiving and processing message traffic.
 - (8) Provide a capability to abandon the current SCP processing session and restart the SCP session using initial preprocessing settings.
 - (9) Provide a capability to establish and maintain multiple queues for message storage and processing.
- d. The stand-alone processes to establish, maintain, and reload the SORTS database addresses the following functional requirements:
- (1) Provide the capability to display record counts, number of rows, totals, and cumulative totals for all tables in the SORTS database.
 - (2) Provide a capability to extract information from the SORTS database for a specific UIC and convert the retrieved data to USMTF format.
 - (3) Provide the capability to unload all or part of the SORTS database in USMTF format to a user-specified file.
 - (4) Provide the capability to effectively backup the SORTS database and related SCP, and SM files to a compressed file format written to a tape archive device.
 - (5) Provide the capability to load or reload the SORTS database from new, updated, or backup data files.
 - (6) Provide the capability to load or reload selective tables in the SORTS database from new, updated, or backup data files.

3.3 External Interface Requirements

The Applications Interfaces Subsystem provides a means of direct and indirect communications between SORTS and other external automated information systems (AIS). These interface functions include the export and import of data in requested formats to and from external systems, operating system calls, the use of C library routines, the use of GCCS Common Operating Environment (COE) services, the use of COTS Oracle products to retrieve data from the SORTS database, and the ability to produce segments of the SORTS database on various storage media for multi-operational usage.

3.3.1 Interface Identification and Diagrams. Figure 3-1 provides a graphic depiction of the SORTS external interfaces. Figures 3-2 through 3-4 provide diagrams of the SORTS operating configurations.

3.3.2 Joint Operations and Planning Execution System (INT-2.01). The SORTS/JOPEs interface is required to fulfill processing requirements specified in JS PUB 1-03.3 (reference (ag)). The SORTS/JOPEs input process includes functions to extract selected JOPEs transaction data from the WWMCCS mainframe computer and format them for processing into the SORTS Operational Planning (OPLAN) database. The SORTS/JOPEs output process includes functions to extract selected SORTS data from the SORTS database and to provide the data to JOPEs as the input to software routines used to update the JOPEs database. The following sections highlight the requirement characteristics of this external interface capability:

- a. Priority. This interface is assigned a priority of 2 (in a range of 1-5; 1 denotes the highest priority). Priorities are assigned in consideration of the level of impact that the interface has on the accomplishment of the functional requirements and objectives of the SORTS application. Priority assignments are subject to change throughout the software life cycle.
- b. Interface Type. Data storage and retrieval.
- c. Data Element Characteristics. Data element characteristics for the SORTS/JOPEs interface input process are described in JS PUB 1-03.3 (reference (ag)). Table 3-1 provides the required data element characteristics for the SORTS/JOPEs output interface functions.
- d. Data Element Assemblies. The SORTS/JOPEs input data consists of WWMCCS SORTS OPLAN database data that has been selected by the SORTS DBA. The SORTS/JOPEs output data is

extracted from the SORTS database, formatted as described in accordance with the required characteristics, placed in a designated file, and then copied to magnetic tape.

- e. Communication Methods. A magnetic tape containing ASCII data is produced by JOPES to update the SORTS OPLAN database. For the SORTS/JOPES output process, a magnetic tape is provided for JOPES to use as input to software routines that update the JOPES database.
- f. Frequency. The SORTS Database Administrator (DBA) determines which SORTS OPLAN database transactions will be used to generate transactions to the SORTS community. Outbound data may be produced twice-a-week, following the SORTS database update and/or upon request.

(Figure 3-1)

(Figure 3-2)

(Figure 3-3)

(Figure 3-4)

Table 3-1. JOPEs Interface Data Elements

<u>Pos</u>	<u>Len</u>	<u>Name</u>	<u>Description</u>	<u>Type</u>
0	1	PROCESS_CODE	Processing Code	Char
1	6	UIC	Unit Identification Code	Char
7	30	ANAME	Unit Designation	
		Char		
37	6	OPCON	Operational Control UIC	
		Char		
43	6	MJCOM	Major Command UIC	
		Char		
49	6	EMBRK	Embarked on Ship UIC	
		Char		
55	4	PRGEO	Present Geo Location Code	
		Char		
59	4	HOGEO	Home Geo Location Code	
		Char		
63	4	ACGEO	Extended Active Duty GeoLoc Code	
		Char		
67	5	UTC	Unit Type Code	Char
72	3	UDC	Unit Description Code	Char
75	1	ULC	Unit Level Code	Char
76	5	AUTH	Authorized Strength Personnel	Num
81	5	ASGD	Assigned Strength Personnel Count	Num
		(variable data)		
86	7	TPSN	Troop Program Sequence Number	Char
93	6		(blank string)	Char
		or		
86	13	NTASK	Task Designator	
		Char		
		(end of variable data)		
99	1	READY	Unit Overall Cat. Level Code	
		Num		
100	1	REASN	Reason Unit Not C-1 Code	Char
101	1	PRRAT	Personnel Category Level Code	
		Num		
102	3	PRRES	Reason Personnel Not C-1 Code	
		Char		
105	1	ERRAT	Equipment Condition Code	Num
106	3	ERRES	Reason Equip Cond Not C-1	
		Char		
109	1	TRRAT	Training Category Level Code	
		Num		

110	3	TRRES	Reason Training Not C-1	
		Char		
113	1	ESRAT	Equip/Supply Cat. Level Code	
		Char		
114	3	ESRES	Reason Equip/Sup Not C-1 Code	
		Char		
117	4	JULIAN_DATE	Current Julian Date	Char
		(YDDD)		
121	1	SOURCE	"U"	Char
122	6	BUPDATE	Update Date	
		Char(YMMDD)		
128	6	UIC	Unit Identification Code	Char
134	1	(EOR Marker)	"/n"	Char

g. Protocols. None.

h. Other Characteristics. None.

3.3.3 Force Augmentation Planning and Execution System (INT-2.02). FAPES supports the manpower mobilization and execution requirements. FAPES has the capability to produce all SORTS data or data related to a single service. The SORTS interface provides an ability to export the unit, personnel, reserve component, and unit transfer data. The following sections highlight the requirement characteristics of this external interface capability:

- a. Priority. This interface is assigned a priority of 2 (in a range of 1-5; 1 denotes the highest priority). Priorities are assigned in consideration of the level of impact that the interface has on the accomplishment of the functional requirements and objectives of the SORTS application. Priority assignments are subject to change throughout the software life cycle.
- b. Interface Type. 3.5-inch Unix formatted diskette.
- c. Data Element Characteristics. Table 3-2 provides the required data element characteristics for the FAPES interface.
- d. Data Element Assemblies. The FAPES data is extracted from the SORTS database, formatted as described in accordance with the required characteristics and written to a diskette.
- e. Communication Methods. A 3.5-inch diskette is provided for FAPES.
- f. Frequency. Upon request.
- g. Protocols. None.
- h. Other. None.

3.3.4 NMCC Command and Control System (INT-2.03). The NCCS maintains a copy of the GCCS SORTS database segments. NCCS obtains the update contents from a designated repository via a direct one-way communications link to the SORTS Master Database platform. The following sections highlight the requirement characteristics of this external interface capability:

- a. Priority. This interface is assigned a priority of 2 (in a range of 1-5; 1 denotes the highest priority). Priorities are assigned in consideration of the level of impact that the interface has on the accomplishment of the functional requirements and objectives of the SORTS application. Priority assignments are subject to change throughout the software life cycle.
- b. Interface Type. Dedicated hard-wire communications link.

Table 3-2. FAPES Interface Data Elements (Part 1 of 2)

UNIT File

<u>Pos</u>	<u>Len</u>	<u>Name</u>	<u>Description</u>	<u>Type</u>
1	6	UIC	Unit Identification Code	Char
7	1	ESRES	Reason Equip/Sup Not C-1	Code
		Char		
8	1	ERRAT	Equip/Condition Cat. Level	Code
		Char		
9	3	ERRES	Reason Equip Cond Not C-1	
		Char		
12	3	CARAT	Forecasted Category Level	Code
		Char		
15	3	MJCC3_KEY	Major Command Code	Char
18	1	READY	Unit Overall Cat. Level	Code
		Char		
19	1	REASN	Reason Unit Not C-1	Code
20	3	TRRES	Reason Training Not C-1	
		Char		
22	3	PRRES	Reason Personnel Not C-1	Code
		Char		
25	1	PRRAT	Personnel Category Level	Code
		Char		
26	5	UTC	Unit Type Code	Char
31	3	SECRN	Secondary Reason Unit Not C-1	Char
34	1	CSERV	CINC, Service or Combatant Command	Char
			Char	
35	1	UDC	Unit Description Code	Char
(1)				
36	3	TERRN	Tertiary Reason Unit Not C-1	Char
39	1	TRRAT	Training Category Level	Code
40	3	ULC	Unit Level Code	Char
49	8	RICDA	As of Category Level Change Date	Date
50	8	CADAT	Forecasted Date of Category Level	Date
			Date	
58	2	ACTIV	Current Status and Activity Code	Char
			(2)	
60	3	UDC	Unit Description Code	Char
62	3	PCTEF	Effectiveness Percentage	Char
65	6	EMBRK	Embarked on Ship UIC	
		Char		
71	4	HOGEO	Home Geo Location Code	Char
75	1	MAJOR	Major Unit Indicator	Char

76	30	ANAME	Unit Designation	Char
105	6	PUIC	Parent Unit Identification Code	Char
111	4	PRGEO	Present Geo Location Code	
				Char
115	1	UTC	Unit Type Code	Char (3)
116	5	AUTH	Authorized Strength Personnel	Char
120	5	ASGD	Assigned Strength Personnel Count	Char
124	1	ESRAT	Equip/Supply Cat. Level Code	
				Char
125	1	UDC	Unit Description Code	Char (4)
126	1	UDC	Unit Description Code	Char (5)

Notes:

1. Position 1 of the UDC field.
2. Positions 1 and 2 of the ACTIVE field.
3. Position 1 of the UTC field.
4. Position 1 of the UDC field.
5. Position 3 of the UDC field.

Table 3-2. (Part 2 of 2)

RESERVES File

<u>Pos</u>	<u>Len</u>	<u>Name</u>	<u>Description</u>	<u>Type</u>
1	6	UIC	Unit Identification Code	Char
8	6	MBCMD	Mobilization Command Unit Id	Char
15	8	ADATE	Extended Active Duty Date	Date
22	4	ACGEO	Extended Active Duty Geolocation	Char
25	8	RDATE	Extended Active Duty Release Date	Date
32	8	MDATE	Scheduled Mobilization Period	Date

TRANSFER File

<u>Pos</u>	<u>Len</u>	<u>Name</u>	<u>Description</u>	<u>Type</u>
1	6	UIC	Unit Identification Code	Char
8	8	ARRDT	Destination Arrival Date	Date

PERSONNEL File

<u>Pos</u>	<u>Len</u>	<u>Name</u>	<u>Description</u>	<u>Type</u>
1	6	UIC	Unit Identification Code	Char
7	2	TPERS	Personnel Type Code	Char
9	5	ASGD	Assigned Strength Personnel Count	Char
14	4	PEGEO	Personnel Geolocation Code	Char
17	5	AUTH	Authorized Strength Personnel	Char
22	4	PICDA	Strength Information Change Date	Date

- c. Data Element Characteristics. A mirror image of the GCCS SORTS database-related segments (GORA and GUPD) are maintained on the NCCS platform.
- d. Data Element Assemblies. The operation of the SORTS/NCCS interface requires that specific data assembly concerns (such as directory and file names) are identical on the SORTS and NCCS computer systems, respectively.
- e. Communication Methods. A designated SORTS data directory is remotely mounted on the NCCS platform. On the NCCS side of the interface, a Unix **cron** activity periodically checks for indications of when the SORTS database on the Master Database platform changes. Upon detecting a change, the new SORTS USMTF transactions are retrieved and processed against the mirror image NCCS SORTS database.
- f. Frequency. As changes are detected by the NCCS **cron** activity following a SORTS update cycle.
- g. Protocols. All communications activities are controlled by the appropriate NCCS personnel. The SORTS application does not include any process that is involved in providing the direct communications link for NCCS.
- h. Other. Any changes made concerning the data assembly characteristics (directory, file designation, etc.) of the SORTS database segments on the SORTS Master Database platform, must be coordinated with the appropriate personnel at the NCCS site. This interface process is, for all intents and purposes, controlled and regulated from the NCCS end.

3.3.5 Joint Maritime Command Information System (INT-2.04). JMCIS is responsible for monitoring Navy ship movements and broadcasting Over-The-Horizon Gold (OTH Gold) formatted transactions to various computer sites. SORTS receives and processes Over-The-Horizon - Transmission (OTH-T) real-time tactical (GOLD formatted) Contact (single position report) message transactions in the SORTS database update process. The JMCIS interface process is capable of operating in automatic, semi-automatic, and manual modes. The following sections highlight the requirement characteristics of this external interface capability:

- a. Priority. This interface is assigned a priority of 5 (in a range of 1-5; 1 denotes the highest priority). Priori-

ties are assigned in consideration of the level of impact that the interface has on the accomplishment of the functional requirements and objectives of the SORTS application. Priority assignments are subject to change throughout the software life cycle.

- b. Interface Type. Storage and retrieval.
- c. Data Element Characteristics. Table 3-3 provides the required data element characteristics for the JMCIS interface.

Table 3-3. JMCIS Interface Data Elements

<u>Pos</u>	<u>Len</u>	<u>Name</u>	<u>Description</u>	<u>Type</u>
1	6	UIC	Unit Identification Code	Char
7	16	LATLONG	Latitude and Longitude Reported	Char
23	12	POSDTG	Date-Time Group Movement Reported	Char
35	6	COURSE	Destination Bearing in Degrees	Char
41	5	SPEED	Speed of Observed Unit	Char
46	3	POSXCS	Arbitrary Track Number Assigned	Char

- d. Data Element Assemblies. OTH-T GOLD Contact message transactions are retrieved from the JMCIS interface (via SIPRNET) and used to update the SORTS database.
- e. Communication Methods. The DISA SORTS Office (at the Pentagon) receives and processes the DN2 transactions to update the SORTS database.
- f. Frequency. Timed interval, upon request, or a combination thereof.
- g. Protocols. None.
- h. Other. None.

3.3.6 Defense Manpower Data Center (INT-2.05). The DMDC interface is characterized as an indirect interface to SORTS. SORTS SQL*Plus database queries produce data in a specified format and designated output file. The following sections highlight the requirement characteristics of this external interface capability:

- a. Priority. This interface is assigned a priority of 3 (in a range of 1-5; 1 denotes the highest priority). Priorities are assigned in consideration of the level of impact that the interface has on the accomplishment of the functional requirements and objectives of the SORTS application. Priority assignments are subject to change throughout the software life cycle.
- b. Interface Type. File storage.
- c. Data Element Characteristics. Table 3-4 provides the required data elements characteristics for the DMDC interface.
- d. Data Element Assemblies. The DMDC data is extracted from the SORTS database, formatted as described in accordance with the required characteristics, and placed in a designated file.
- e. Communication Methods. The extracted data is copied from the output file and copied to a 150 megabyte (MB) **tar**-formatted tape cartridge. The cartridge is then mailed to the DMDC-West facility.
- f. Frequency. Monthly.

g. Protocols. None.

h. Other. None.

3.3.7 Automated Message Handling System (INT-2.06). A direct communications link and associated software processes are used to provide an interface between SORTS and the GCCS AMHS. The functional capabilities include retrieving SORTS incoming transaction messages (sent via AUTODIN), providing those transactions to the SORTS database update process, producing valid outgoing messages, and

Table 3-4. DMDC Interface Data Elements

<u>Pos</u>	<u>Len</u>	<u>Name</u>	<u>Description</u>	<u>Type</u>
0	6	RUNDATE	P r o c e s s i n g	D a t e
			Num (YYMMDD)	
6	6	UIC	U n i t	I d e n t i f i c a t i o n
		Char		C o d e
12	3	UDC	U n i t	D e s c r i p t i o n
		Char		C o d e
15	3	ULC	U n i t	L e v e l
		Char		C o d e
18	5	UTC	U n i t	T y p e
		Char		C o d e
23	30	ANAME		
		U n i t	D e s i g n a t i o n	
		Char		
53	17	NAME_GEO	G e o g r a p h i c	L o c a t i o n
		Char		N a m e
70	2	CRT_CD_GEO	C o u n t r y / S t a t e	C o d e
		Char		
72	7	LAT_GEO	G e o g r a p h i c	L a t i t u d e
		Char		
79	8	LONG_GEO	G e o g r a p h i c	L o n g i t u d e
		Char		
87	3	MJCC3_KEY	M a j o r	C o m m a n d
		Char		C o d e
90	1	READY	U n i t	O v e r a l l
		Num		C a t .
				L e v e l
				C o d e
91	1	REASN	R e a s o n	U n i t
		Char		N o t
				C - 1
				C o d e
92	1	PRRAT	P e r s o n n e l	C a t e g o r y
		Num		L e v e l
				C o d e
93	3	PRRES	R e a s o n	P e r s o n n e l
		Char		N o t
				C - 1
				C o d e

96	1	ESRAT				
		Equip / Supply	Cat .	Level	Code	
		Char				
97	3	ESRES				
		Reason	Equip / Sup	Not	C - 1	Code
		Char				
100	1	ERRAT				
		Equipment	Condition		Code	
		Num				
101	3	ERRES				
		Reason	Equip	Cond	Not	C - 1
		Char				
104	1	TRRAT				
		Training	Category	Level	Code	
		Num				
105	3	TRRES				
		Reason	Training	Not	C - 1	
		Char				
108	6	RICDA				
		Category	Level	Change	Date	
		Num (YYMMDD)				

verifying the successful transmission of those messages. The following sections highlight the requirement characteristics of this external interface capability:

- a. Priority. This interface is assigned a priority of 1 (in a range of 1-5; 1 denotes the highest priority). Priorities are assigned in consideration of the level of impact that the interface has on the accomplishment of the functional requirements and objectives of the SORTS application. Priority assignments are subject to change throughout the software life cycle.
- b. Interface Type. File storage and retrieval.
- c. Data Element Characteristics. The GCCS AMHS data consists of either ACP 126 or JANAP 128 formatted AUTODIN messages. Incoming messages to SORTS are also content-formatted to be USMTF-compliant.
- d. Data Element Assemblies. Designated files are used to store and retrieve outbound and incoming messages, respectively, for the AMHS API.
- e. Communication Methods. SORTS uses communication methods that are provided by the GCCS AMHS API. Designated files are used to store and retrieve outbound and incoming messages. SORTS messages received by GCCS AMHS are routed to designated input files based upon pre-set identification criteria. These messages are then retrieved and processing by SORTS.

Messages intended for output transmission are placed in a designated file by SORTS. The GCCS AMHS API process retrieves the messages, performs validation actions, and then transmits the successfully validated messages.

- f. Frequency. Timed interval and upon request.
- g. Protocols. SIPRNET standard protocols.
- h. Other. None.

3.3.8 NMCS Automated Control Executive (INT-2.07). The NACE provides queues to capture AUTODIN message traffic on the WWMCCS. The NACE traffic is used to update the SORTS database. The message traffic is copied from NACE (resident on the Honeywell Readiness

computer system) and converted for manual transfer to the SORTS Master Database platform. The following sections highlight the requirement characteristics of this external interface capability:

- a. Priority. This interface is assigned a priority of 1 (in a range of 1-5; 1 denotes the highest priority). Priorities are assigned in consideration of the level of impact that the interface has on the accomplishment of the functional requirements and objectives of the SORTS application. Priority assignments are subject to change throughout the software life cycle.
- b. Interface Type. Storage and retrieval.
- c. Data Element Characteristics. The NACE data consists of either ACP 126 or JANAP 128 formatted AUTODIN messages. Incoming messages to SORTS are also content-formatted to be either USMTF-compliant or JRS-compliant (Marine Corps only).
- d. Data Element Assemblies. Designated NACE internal queues are used to store messages for incoming and outgoing SORTS processing.
- e. Communication Methods. SORTS uses communication methods that are provided by NACE. Designated NACE internal storage queues are used to store and retrieve out bound and incoming messages. SORTS messages received by NACE are routed to designated queues based upon pre-set identification criteria. These messages are then copied to a magnetic tape for processing by SORTS.

SORTS messages intended for AUTODIN output transmission by NACE are directed to a magnetic tape and transported to the mainframe computer for retrieval and processing by NACE.
- f. Frequency. Upon request.
- g. Protocols. None.
- h. Other. None.

3.3.9 Joint Spectrum Center (INT-2.08). The JSC interface was created to fulfill the SORTS/JSC data interface processing requirement. This process extracts selected data fields on all units in the SORTS database and produces data in a specified JSC

file. The JSC data is loaded on a tape cartridge in Unix **tar** format and then transported to the JSC destination. The following sections highlight the requirement characteristics of this external interface capability:

- a. Priority. This interface is assigned a priority of 3 (in a range of 1-5; 1 denotes the highest priority). Priorities are assigned in consideration of the level of impact that the interface has on the accomplishment of the functional requirements and objectives of the SORTS application. Priority assignments are subject to change throughout the software life cycle.
- b. Interface Type. Storage and retrieval.
- c. Data Element Characteristics. Table 3-5 provides the required data elements characteristic for the JSC interface.

Table 3-5. JSC Interface Data Elements (Part 1 of 2)

Record Type 101:

<u>Pos</u>	<u>Len</u>	<u>Name</u>	<u>Description</u>	<u>Type</u>
0	6	UIC	Unit Identification Code	Char
6	3	(variable)	"101"	
		Num		
9	1	SCLAS	Security Classification Code	
		Char		
10	30	ANAME	Unit Designation	
		Char		
40	5	UTC	Unit Type Code	Char
45	54	TYPNM	Unit Type Long Name	Char
99	1	UDC	Unit Description Code	Char
100	3	ULC	Unit Level Code	Char
103	10		(blank string)	Char
113	1	(EOR Marker)	"/n"	Char

Record Type 106:

<u>Pos</u>	<u>Len</u>	<u>Name</u>	<u>Description</u>	<u>Type</u>
0	6	UIC	Unit Identification Code	Char
6	3	(variable)	"106"	
		Num		
9	6	OPCON	Operational Control UIC	
		Char		
15	17	NAME_GEO	Geographic Location Name	Char
32	2	CRT_CD_GEO	Country/State Code	Char
34	15	LNAME_GEO	Country/State Name	Char
49	7	LAT_GEO	Geographic Latitude	Char
56	8	LONG_GEO	Geographic Longitude	Char
64	17	NAME_GEO	Geographic Location Name	Char
81	2	CRT_CD_GEO	Country/State Code	Char
83	15	LNAME_GEO	Country/State Name	Char
98	7	LAT_GEO	Geographic Latitude	Char
105	8	LONG_GEO	Geographic Longitude	Char
113	1	(EOR Marker)	"/n"	Char

Record Type 108:

<u>Pos</u>	<u>Len</u>	<u>Name</u>	<u>Description</u>	<u>Type</u>
0	6	UIC	Unit Identification Code	Char
6	3	(variable)	"108"	
		Num		
9	13	NTASK	Task Designator	
		Char		
22	91		(blank string)	Char
113	1	(EOR Marker)	"/n"	Char

Table 3-5. (Part 2 of 2)

Record Type 213:

<u>Pos</u>	<u>Len</u>	<u>Name</u>	<u>Description</u>	<u>Type</u>
0	6	UIC	Unit Identification Code	Char
6	3	(variable)	"213"	
	Num			
9	18	MEQ_NAME	Major Equipment Name	Char
27	13	LD_MEQPT		
40	3	LD_MEPSA		
43	3	LD_MEPSD		
46	17	NAME_GEO	Geographic Location Name	Char
63	50		(blank string)	Char
113	1	(EOR Marker)	"/n"	Char

Record Type 251:

<u>Pos</u>	<u>Len</u>	<u>Name</u>	<u>Description</u>	<u>Type</u>
0	6	UIC	Unit Identification Code	Char
6	3	(variable)	"251"	
	Num			
9	5	LD_PLAN_NO_251		
14	99		(blank string)	Char
113	1	(EOR Marker)	"/n"	Char

- d. Data Element Assemblies. This process extracts selected data fields on all units in the SORTS database, writes the data to a file which is then copied to a magnetic tape cartridge.
- e. Communication Methods. The extracted data is copied from the output file and copied to a 150 MB Unix-formatted tape cartridge. The cartridge is then provided to JSC.
- f. Frequency. Monthly and upon request.
- g. Protocols. None.

3.4 Internal Interface Requirements

The internal interface capability requirements for the SORTS subsystems that necessitate interaction are described in the following sections.

3.4.1 User Interface-to-Database Processing (RIN-1.01). This two-way interface provides SORTS users with the ability to access, retrieve, and process information from the SORTS database. The interface allows users to create queries, reports, and conduct reviews of the database on demand. Reference sections 3.2.1.2 through 3.2.1.4 for detailed descriptions of User Interface requirement capabilities that pertain to database processing.

3.4.2 System Utilities-to-Database Processing (RIN-4.01). This two-way interface provides the SORTS system administrative personnel with the ability to monitor and control database-related processes. The System Utility Subsystem includes various tools and functional capabilities to perform stand-alone actions to establish the database, initialize data structures, and perform standard database administrative functions. Reference section 3.2.4 for detailed descriptions of System Utilities requirement capabilities that pertain to database processing.

3.5 Internal Data Requirements

The following sections describe the internal data requirements for the SORTS software.

3.5.1 Database Data Characteristics (DAT-01). SORTS uses information obtained from the SORTS database to satisfy the needs of its users and to facilitate the performance of its functional requirements. Detailed requirement information regarding individual

database resident data elements such as name, type, size and format, range of values, etc. is provided in the SORTS Database Specification (reference (i)). The requirements for the database data assembly characteristics are provided in section 3.2.2.1 of this specification.

3.5.2 Software Data and File Requirements (DAT-02). This section describes the requirements related to software data elements and storage conventions that are used in the SORTS development, testing, and operational environments.

3.5.2.1 Data Element Characteristics. Internal data element decisions regarding particular characteristics will generally be made in the design and implementation phase for the SORTS software. However, the following requirement provides guidance for the content of the data element decisions:

The decisions must reflect software engineering standards for the software language that will be used in development, testing, and operational environments.

3.5.2.2 Data Assembly Characteristics. The following characteristics are required for the SORTS data storage files:

Computer data directories, subdirectories, and files must be organized in accordance with configuration management standards that are in use for their respective environments.

3.6 Adaptation Requirements (REQ-02)

The following SORTS site-unique software adaptation requirements are inclusive of operations on the SPARC and the WWS:

- a. On the WWS, SORTS processing software must be site-adaptable to execute and operate on either a 2-disk or 3-disk hardware configuration, as required by site equipment.
- b. On the WWS, SORTS software must be site-adaptable to execute and operate on workstations with 16 to 32 MB of resident memory.
- c. The SORTS software must be site-adaptable to allow for local, daylight savings, and Zulu time settings.

- d. SORTS and GSORTS software must be site-adaptable to operate in either a client-server architecture or stand-alone architecture.
- e. In GCCS environments, GSORTS software must be site-adaptable to effectively utilize, or point, to either local or remote SORTS databases.
- f. GSORTS software must be adaptable to site-specified local printers or GCCS-defined network printers.

3.7 Safety Requirements

SORTS is a software product and is intended for use in an office environment. As such, there are no applicable requirements regarding potential hazards to personnel, property, and physical environment.

3.8 Security and Privacy Requirements (REQ-03)

SORTS software (as well as the GSORTS application) is released as an unclassified system and all system files released with it are **UNCLASSIFIED**. SORTS features can be used to analyze and present classified information from the SORTS classified **SECRET NOFORN** database. Therefore, SORTS shall provide the capability to meet security requirements as outlined in DoD Directive 5200.28 for C2 class (DoD-STD-5200.28).

Requirements regarding integrity are specified in section 3.11.3 of this specification.

3.9 Environment Requirements (REQ-04)

SORTS (as well as the GSORTS application) is developed in accordance with the standards identified in the SORTS/GSORTS Software Standards and Procedures Manual (reference (y)). SORTS processor sites serve as SORTS data servers and SORTS workstations for the SORTS Master Database platform (located at the Pentagon) and WWS. The SORTS Master Database processor site is a stand-alone Sun 690 server located at the Pentagon in the DISA SORTS Office (Room BF715, Alarm 28). This platform receives and processes data from the SORTS workstations, and updates the SORTS Master Database and release query outputs. The WWS receives and processes data from

client nodes and then updates the SORTS Master Database platform. The NMCC's GCCS site is updated directly from the SORTS Master Database platform. Table 3-6 lists the software components necessary for each platform to operate effectively within SORTS.

The GCCS Data Server at all supported GCCS sites is supported by the SORTS GCCS segments (GORA, GUPD, GSORTS, and GWORLD). SPARC 5 workstations use the SORTS GCCS client segment (GSORTSC) to access the SORTS database on the GCCS Data Server. The NMCC SORTS Processor interfaces with the GCCS Automated Message Handling System (AMHS) server; it can also receive direct data feeds from GCCS sites through the SIPRNET (as illustrated in figure 3-3). The GCCS Common Operating Environment (COE) is an integrated package of software segments. The order for segmentation integration and additional COE requirements are addressed in the current version release of JIEO's Implementation Procedures Documentation for Automated Information Systems (reference (t)).

The SORTS Processor requires the SORTS Communications Processor (SCP) to parse the incoming message traffic. The SCP output is United States Message Text Format (USMTF). The SCP was developed from the Universal Communications Processor (UCP)--a COTS product. The UCP was tailored to support the SORTS USMTF message traffic requirements and redesignated as the SCP. The SCP is operational in the WWS, Sun and GCCS COE environments.

The mainframe interfaces used by the WWS to move USMTF message traffic are SWIM v1.0 for WIN processing, NACE v4.2 and its components, PC-WAGES v5.0 and NICE v1.0 processor NSXFR for AUTODIN processing. GIPSY v5.3 is needed by the mainframe to create the GEOFILE subset for WWS sites.

Table 3-6. SORTS Platform Software Requirements

System Software Components	WWS Platform	Sun Platform	GCCS COE Platform
Operating System (Unix)	Secure A/UX 2.0 Release 3C	SunOS 4.1.3	Solaris 2.3
GNU ANSI C Compiler	gcc 1.40	gcc 2.3.3	gcc 2.5.90
X-Windows	X11R4 (MacX 1.1.7)	X11R5	X11R5
Motif	1.1.4	1.2.2	1.2.2
Oracle RDBMS	6.0.30.3.1	6.0.30.3.1	7.1.4.1.0
Pro*C	1.3.15.1.2	1.3.15.1.2	2.0.3.0.0
SQL*Loader	1.0.18.1.4	1.0.18.1.3	7.1.4.1.0
SQL*Plus	3.08.1.1	3.08.1.1	3.1.3.5.1
PL/SQL	1.0.30.1.1	1.0.31.0.2	2.1.4.0.0
SQL*Forms	2.3.31.1.3	2.3.31.1.3	3.0 3.0.16.12.8 4.0 4.0.13.17.1
SQL*Net	V1 1.2	V1 1.2.7.8.1	V2 2.1.4.1.0
SCP	1.2	1.2	1.2

The SCO 386 Unix release Version 3.0 is required for Unix software development. The software is ported to the WWS and GCCS COE for compilation and testing before integration.

The GCCS COE has not identified any specific PC software. It provides installation instructions for PCXware in JIEO's System Administration Manual, GCCS Version 2.1 (reference (z)). GSORTS has been successfully demonstrated as a client with PCXware.

The following computer hardware requirements are applicable for use as SORTS processors, database servers and SORTS workstations. The disk requirements discussed are supplemental to the segment sizes. SORTS hardware resources requirements are listed in table 3-7.

The Joint SORTS database requires an additional 300 megabytes (MB) of disk storage for the WWS and 750 MB for the GCCS COE. The GCCS COE contains additional database tables that are not available on the WWS. The SORTS Major Command (MAJCOM) database can be stored on the WWS 240 MB disk; its size is dependent on the number of serving units and the historical information retained.

The GCCS COE requirements for the GCCS Sun SPARC platforms are addressed in the current release of JIEO's System Administration Manual, GCCS Version 2.1 (reference (z)). SORTS requires additional disk space to load the following SORTS segments in the GCCS environment. The GSORTSC segment provides the SPARC 5 workstation connectivity to the GSORTS segment acting as the SORTS Server. The GSORTS segment ties to the SORTS database server as defined by SORTS segment, GORA, and updated from the GUPD segment. The GUPD segment requires 150 MB additional disk space to allow for SORTS portion of the database rebuilds and normal daily update processing.

3.10 Computer Resource Requirements

This section specifies the computer resource requirements that are used by the SORTS subsystems.

3.10.1 Computer Hardware Requirements (REQ-05). This section provides a description of the minimum hardware requirements for the SORTS operations at supported sites on the Sun and WWS platforms.

3.10.1.1 SORTS Processor Site. The following sections delineate the equipment requirements for the system operations site at the Pentagon.

3.10.1.1.1 Operational Hardware Configuration. The following hardware is required for SORTS Master Processor operations:

- a. Sun SPARC 690 server and the following peripherals (a Sun SPARC 1000 server is preferred but currently unavailable):

- (1) Sun 19" color monitor

Table 3-7. SORTS Hardware Resources

Hardware Platforms	SORTS Segment	RAM Memory (MB)	Disk Storage (MB)	Swap Space (MB)
SPARC 5 SPARC 10 SPARC 20	GSORTSC	32	0.074	0
SPARC 2000 SPARC 1000 SPARC 690	GWORLD	32	789.4	0
SPARC 2000 SPARC 1000 SPARC 690	GORA	32	830.2	0
SPARC 2000 SPARC 1000 SPARC 690	GUPD	32	82.3	0
SPARC 20 SPARC 690	GSORTS	32	16.4	0
WWS	N/A	16	35.3	16
WWS	N/A	32	35.3	0
DataWatch 486	N/A	16	0	0
DataWatch 386	N/A	8	0	0
DataWatch 386	N/A	8	0	0

- (2) 2 gigabyte (GB) Disk Drive (4 each)
- (3) 8 millimeter (mm) tape drive
- (4) 150 MB 1/4 inch tape drive
- (5) 9-track tape drive
- (6) CD-ROM drive
- (7) PostScript-capable printer
- (8) Sun mouse
- (9) Standard keyboard
- (10) Berkeley Socket.

b. WIS Workstation (Macintosh IIx) and the following peripherals:

- (1) Mitsubishi 19-inch color monitor
- (2) 240 MB disk drive (4 are required for Joint and Service sites, 3 or 2 are required for Major Command sites based on number of units being served by site.)
- (3) 150 MB tape drive
- (4) 3.5 inch floppy drive
- (5) 5.25 inch floppy drive
- (6) PostScript-capable printer
- (7) Apple 1-button mouse, Model #A9M0331
- (8) Apple extended keyboard II.

c. Sun SPARC 5 client and the following peripherals:

- (1) Sun 19" color monitor
- (2) 1.1 GB Disk Drive (2 minimum, 4 desired)
- (3) 4 mm tape drive

- (4) 3.5 inch floppy drive
- (5) CD-ROM drive
- (6) Sun mouse
- (7) Standard keyboard
- (8) 150 MB 1/4 inch tape drive (optional).

3.10.1.1.2 Developmental Hardware Configuration. The following hardware is required for SORTS software development:

- a. Sun SPARC 690 server and the following peripheral (a Sun SPARC 1000 server is preferred but currently unavailable):

- (1) Sun 19" color monitor
- (2) 2 GB disk drive (4 minimum)
- (3) 8 mm tape drive
- (4) 4 mm tape drive (optional)
- (5) 150 MB 1/4 inch tape drive
- (6) 9-track tape drive (optional)
- (7) CD-ROM drive
- (8) PostScript-capable printer
- (9) Sun mouse
- (10) Standard keyboard
- (11) Berkeley Socket.

- b. WIS Workstation (Macintosh IIfx) and the following peripherals:

- (1) Mitsubishi 19-inch color monitor
- (2) 240 MB disk drive (4 are required for development)
- (3) 150 MB tape drive

- (4) 3.5 inch floppy drive
 - (5) 5.25 inch floppy drive
 - (6) PostScript-capable printer
 - (7) Apple 1-button mouse, Model #A9M0331
 - (8) Apple extended keyboard II.
- c. Sun SPARC 5 client and the following peripherals:
- (1) Sun 19 inch color monitor
 - (2) 1.1 GB disk drive (2 minimum, 4 desired)
 - (3) 4 mm tape drive
 - (4) 3.5 inch floppy drive
 - (5) CD-ROM drive
 - (6) Sun mouse
 - (7) Standard keyboard
 - (8) 150 MB 1/4 inch tape drive (optional)
 - (9) 8 mm tape drive (optional).
- d. Sun SPARC 2 clone and the following peripherals (a Sun SPARC 5 clone preferred but currently unavailable):
- (1) Sun 19 inch color monitor
 - (2) 1.1 GB disk drive (2 minimum, 4 desired)
 - (3) 150 MB 1/4 inch tape drive
 - (4) 3.5 inch floppy drive
 - (5) CD-ROM drive
 - (6) Sun mouse
 - (7) Standard keyboard

(8) 4 mm tape drive (optional).

3.10.1.2 SORTS Database/Server Sites. The following sections delineate the equipment requirements for the GCCS operational sites.

3.10.1.2.1 Operational Hardware Configuration. The GCCS COE hardware is site-dependent. The GCCS COE system is comprised of the Sun SPARC 1000 or SPARC 2000 as GCCS Database Servers, some number (usually 3) Sun SPARC 20 workstations for Application Servers, and some number of Sun SPARC 5 workstations for the GCCS clients. The basic GCCS system configuration is the Sun SPARC 1000 database server and at least 2 - Sun SPARC 20 servers; actual hardware configurations vary between location. Additional hardware configuration requirements are specified in JIEO's System Administration Manual, GCCS Version 2.1 (reference (z)) and the current GCCS version release of Implementation Procedures Documentation for Automated Information Systems (reference (t)). Hardware requirements are as follows:

a. Database Servers:

- (1) Sun SPARCcenter 2000 with dual 30 GB SPARCstorageArray, monitor, keyboard, and 4mm/8mm external tape drive
- (2) Sun SPARC server 1000 with dual 30 GB SPARCstorageArray, monitor, keyboard, and 4mm/8mm external tape drive
- (3) Sun SPARC server 1000 with dual 30 GB SPARCstorageArray with 10GB pedestal, monitor, keyboard, and 4mm/8mm external tape drive.

b. Security/Application Servers:

- (1) Sun SPARCstation 20 with external 2GB drive, monitor, keyboard, and 4mm/8mm external tape drive
- (2) Sun SPARCstation 20 with external 2GB drive, monitor, keyboard, 4mm/8mm external tape drive, and external CD ROM drive.

c. GCCS Clients: Sun SPARCstation 5 with external 2 GB drive or two external 1.1 GB drives, monitor, keyboard, 4mm/8mm external tape drive, and external CD ROM drive.

3.10.1.2.2 WWS Operational Hardware Configuration. The WWS hardware depends on the primary WWS platform. The 32 MB platform serves the larger sites. It should be configured identical to the configuration described in section 3.10.1.1.2(b). The number of disks drives should match the processor configuration.

3.10.2 Computer Hardware Resource Utilization Requirements (REQ-06). This section provides a description of the minimum hardware resource utilization requirements for the SORTS operations at supported sites on the Sun and WWS platforms.

3.10.2.1 Operational Hardware Configuration. The following resource utilization attributes are the minimum required for hardware used in SORTS operations:

a. Sun SPARC 690 server:

- (1) Memory - 32 MB of random access memory (RAM)
- (2) Disk space:
 - (a) 1,620.6 MB of available disk space (to install SORTS software)
 - (b) A sufficient amount of space to accommodate user activities.
- (3) Communications:
 - (a) SIPRNET connection
 - (b) JMCIS connection.

b. WIS Workstation (Honeywell/Macintosh):

- (1) Memory (two types of configurations):
 - (a) 16 MB of RAM with 16 MB swap space
 - (b) 32 MB of RAM with 0 MB swap space.
- (2) Disk space:
 - (a) 2-disk system - 648 MB
 - (b) 3-disk system - 864 MB.

- (3) Communications - Ethernet connection.
- c. Sun SPARC 5 client:
 - (1) Memory - 32 MB of RAM
 - (2) Disk space:
 - (a) 0.074 MB of available disk space (to install the GSORTSC segment)
 - (b) A sufficient amount of space to accommodate user activities.
 - (3) Communications:
 - (a) SIPRNET connection
 - (b) JMCIS connection.

3.10.2.2 Developmental Hardware Configuration. The following resource utilization attributes are the minimum required for hardware used in the development of SORTS:

- a. Sun SPARC 690 server:
 - (1) Memory - 32 MB of RAM
 - (2) Disk space:
 - (a) 1,620.6 MB of available disk space (to install SORTS software)
 - (b) A sufficient amount of space to accommodate user activities.
 - (3) Communications - SIPRNET connection.
- b. WIS Workstation (Macintosh):
 - (1) Memory (two types of configurations):
 - (a) 16 MB of RAM with 16 MB swap space, or
 - (b) 32 MB of RAM with 0 MB swap space.

- (2) Disk space:
 - (a) 2-disk system - 648 MB
 - (b) 3-disk system - 864 MB
 - (c) A sufficient amount of space to accommodate user activities.
- (3) Communications - Ethernet connection.
- c. Sun SPARC 5 client:
 - (1) Memory - 32 MB of RAM
 - (2) Disk space:
 - (a) 1,620.6 MB of available disk space (to install SORTS software)
 - (b) A sufficient amount of space to accommodate user activities.
 - (3) Communications:
 - (a) SIPRNET connection
 - (b) JMCIS connection.
- d. Sun SPARC 2 clone:
 - (1) Memory - 32 MB of RAM
 - (2) Disk space:
 - (a) 1,620.6 MB of available disk space (to install SORTS software)
 - (b) A sufficient amount of space to accommodate user activities.
 - (3) Communications - SIPRNET connection.
- e. Datawatch 486/386:
 - (1) Memory - 32 MB of RAM

(2) Disk space:

- (a) 1,620.6 MB of available disk space (to install SORTS software)
- (b) A sufficient amount of space to accommodate user activities.

(3) Communications - SIPRNET connection.

3.10.3 Computer Software Requirements (REQ-07). This section provides a description of the software requirements for the SORTS operations at supported sites on the Sun and WWS platforms.

3.10.3.1 Operational Site. The SORTS software is utilized as a mission application of the GCCS COE. The following software is required for effective operations equipment:

a. COTS Software:

- (1) Solaris 2.3
- (2) Oracle RDBMS, Version 7.1.4
- (3) Oracle SQL*Forms, Version 3.0.16.12.8
- (4) Oracle SQL*Loader, Version 7.1.3.0.0
- (5) Oracle SQL*Net, Version 2.1.3
- (6) Oracle SQL*Plus, Version 3.1.3.4.1
- (7) X Windows Version 11, Release 5 (X11R5) server
- (8) Motif Window Manager (mwm), Release 1.2.2
- (9) NeWSprint, Version 1.2.

b. Government-off-the-Shelf (GOTS) Software:

- (1) Mapping Workstation System (MWS), Version 1.0, Release 1
- (2) GCCS Desktop (Executive Manager), Version 5.01.

c. Other Material:

- (1) 8 mm magnetic tape loaded with the current software release (no source code)
- (2) 8 mm tape loaded with sample input transactions for database processing testing.

3.10.3.2 SORTS Processor Site. The following sections describe the software requirements for system operations and testing at the DISA SORTS Office development site (in the Pentagon).

3.10.3.2.1 Sun Software Configuration. The following software is required:

a. COTS Software:

- (1) Solaris 2.3
- (2) Oracle Relational Database Management System (RDBMS), Version 7.1.4
- (3) Oracle SQL*Forms, Version 3.0.16.12.8
- (4) Oracle SQL*Loader, Version 7.1.4.0.0
- (5) Oracle SQL*Net, Version 2.1.3
- (6) Oracle SQL*Plus, Version 3.1.3.4.1
- (7) X Windows Version 11, Release 5 (X11R5) server
- (8) Motif Window Manager (mwm), Release 1.2.2
- (9) NewsPrint, Version 1.2
- (10) SORTS Communications Processor (SCP), Version 1.2.

b. Government-off-the-Shelf (GOTS) Software:

- (1) Mapping Workstation System (MWS), Version 1.0, Release 1
- (2) GCCS Desktop (Executive Manager), Version 5.01
- (3) NMCS Automated Control Executive (NACE), Version 4.2.

c. Other Material:

- (1) 8 mm magnetic tape loaded with the current software release (no source code)
- (2) 8 mm tape loaded with sample input transactions for database processing testing.

3.10.3.2.2 WWS Software Configuration. The following software is required:

a. COTS Software:

- (1) Apple/Unix (A/UX), Release 2.0 (HFSI Release 3C)
- (2) MacX[™] (X Window System Server), Release 1.1.7
- (3) Oracle RDBMS for A/UX, Version 6.0.30.3.1
- (4) Oracle SQL*Forms version 2.3.31.1.3
- (5) Oracle SQL*Loader, Version 1.0.18.1.4
- (6) Oracle SQL*Net, Version 1.2
- (7) Oracle SQL*Plus, Version 3.0.8.1.1
- (8) SCP, Version 1.2.

b. GOTS Software:

- (1) Enhanced Terminal Capability (ETC), Release X1.0.0
- (2) NACE, Version 4.2.

c. Other Material:

- (1) 150 MB magnetic tape loaded with the current software release (no source code)
- (2) 3.5 inch floppy disk with the required installation scripts
- (3) 150 MB tape loaded with sample input transactions for database processing testing.

3.10.3.3 Other Materials. In addition to the hardware and software items listed above, other materials are required to support testing and operational activities as follows:

- a. GSORTS Users Guide, reference (r)
- b. FRAS Users Manual, reference (d)
- c. SORTS Software Version Description (for that system release)
- d. SORTS Problem Reports (either hard copy or access to the on-line system on DISANet)
- e. SORTS Administrator Guide, reference (g)
- f. Database Specification, reference (i)
- g. Software Test Plan
- h. Software Test Description (Volumes I-IV)
- i. SORTS Computer System Operator's Manual, reference (x)
- j. Global System Problem Reports (GSPRs are available from the CM Branch at the OSF).

3.10.4 Computer Communication Requirements (REQ-08). This section specifies the requirements that are concerned with communications for the SORTS subsystems.

3.10.4.1 Developmental Site. The following sections provide the communications requirements for the system operation and testing at the SORTS development site at the Pentagon.

3.10.4.1.1 Sun Configuration. The following communication interfaces and associated specifications are required:

- a. Secret Internet Protocol Router Network (SIPRNET)
(Detailed information available in the Defense Information System Network, Secret Internet Protocol Router Network (SIPRNET), Internet Protocol Addressing Plan.)
 - (1) Type. Wide Area Network (WAN).
 - (2) Configuration. WAN.

- (3) Transmission/Reception Techniques. See Defense Information System, Secret Internet Protocol Router Network (SIPRNET), Internet Protocol Addressing Plan, Section 1.
- (4) Data Transfer Rate. 19.2 Kbps to 10 Mbps; dependent upon system configuration parameters.
- (5) Protocols. SIPRNET supports various standard protocols.

b. National Military Command Center Command and Control System (NCCS)

- (1) Type. Point-to-point.
- (2) Configuration. Direct connection.
- (3) Transmission/Reception Techniques. Data retrieval controlled by determinate on NCCS side.
- (4) Data Transfer Rate. 9600 baud.
- (5) Protocols. Determined by NCCS.

3.10.4.1.2 WWS Configuration. The following communication interfaces and associated specifications are required:

a. Ethernet

- (1) Type. Local area network (LAN)
- (2) Configuration. NFS Network
- (3) Transmission/Reception Techniques. Serial
- (4) Data Transfer Rate. 9600 baud
- (5) Protocols. See WIS Workstation Segment System Administrator's Manual, for protocol used and protocols supported.

3.10.4.2 Operational Site. The following communication interfaces and associated specifications are required at GCCS operational sites:

a. Secret Internet Protocol Router Network (SIPRNET)

- (1) Type. Wide area network (WAN)
- (2) Configuration. WAN.
- (3) Transmission/Reception Techniques. See Defense Information System, Secret Internet Protocol Router Network (SIPRNET), Internet Protocol Addressing Plan, Section 1.
- (4) Data Transfer Rate. 19.2 Kbps to 10 Mbps; dependent upon system configuration parameters.
- (5) Protocols. SIPRNET supports various standard protocols.

3.11 Software Quality Factors (REQ-09)

The following sections specify the software quality factors or "fitness for use" characteristics that are required for all SORTS subsystems. They are divided into 11 categories: correctness, reliability, efficiency, integrity, usability, maintainability, testability, flexibility, portability, reusability, and interoperability.

3.11.1 Correctness Requirements. The requirements contained in this section specify the extent to which the system is expected to satisfy its functional specifications and fulfill the user's mission objectives. The functionality requirements are:

- a. The software shall be complete. The functionality of the system must provide a full implementation of the required functions.
- b. The software functions shall be traceable. The functionality of the system must possess a clear linkage from the requirements to the implementation with respect to the specific development and operational environment.
- c. The software shall be consistent. The developers are required to provide uniform design and implementation of techniques and notation.

3.11.2 Reliability Requirements. The requirements contained in this section specify the extent to which the system is expected to

perform its intended functions with required precision. The reliability requirements are:

- a. The error tolerance of the software shall be 2 percent. The system is required to provide continuity of operation at least 98 percent of the time.
- b. The software shall be consistent. The contractor is required to provide uniform design and implementation of techniques and notation.
- c. The software shall be accurate. The software must provide the user's required precision in calculations and outputs within the limitations of the various COTS and GOTS package being used.
- d. The software shall be simplistic. The functions of the system must be implemented in a most understandable manner and avoid those coding/implementation practices that increase complexity.

3.11.3 Integrity Requirements. The requirements contained in this section specify the extent to which access to the system's software or data by unauthorized persons should be controlled. Access controls are enforced by site administrators for Unix logon access and site DBAs for Oracle logon and SORTS table access rights. The integrity requirements are:

- a. The system shall be access controlled. To the extent provided by the workstation environments, only authorized users shall be permitted to access and execute this system.
- b. The software shall be access auditable. Some methodology must provided for an audits of the access of both software and data.

3.11.4 Usability Requirements. The requirements contained in this section specify the effort required to learn, operate, prepare, input, and interpret the output of this system (for additional information on training-related requirements for SORTS, refer to section 3.14). The usability requirements are:

- a. The software shall be communicative and provide useful inputs and outputs which can be assimilated by the user.

- b. The software shall be operable. A smooth transition period and initial familiarizations must be provided whenever appropriate.

3.11.5 Maintainability Requirements. The requirements contained in this section specify the effort required to locate and fix an error in the operational software. The maintainability requirements are:

- a. The software shall be consistent. The developer is required to provide uniform design and implementation of techniques and notation.
- b. The software shall simplistic. The functions of the system must be implemented in a most understandable manner and avoid those coding/implementation practices that increase complexity.
- c. The software shall be concise. Functions must be implemented with a minimum amount of code.
- d. The software shall be modular. The modularity of the system shall be designed and implemented using four major attributes:

- (1) Cohesiveness refers to the functional strength of a module, or how single-minded a module is. The developers shall strive for high cohesion (functional) wherever possible although mid-range cohesion is acceptable. The seven types of module cohesion (in order of increasing desirability) are:

- (a) Coincidental cohesion wherein the parts of a module are not related but are simply bundled together.
- (b) Logical cohesion wherein components which perform similar functions such as input, error handling, etc. are placed together in a single module.
- (c) Temporal cohesion wherein all of the components that are activated at the same time, such as start up or shut down, are bundled together.
- (d) Procedural cohesion wherein the parts of a module make up a single control sequence.

- (e) Communicational cohesion wherein all of the elements of a module operate on the same input data or produce the same output.
 - (f) Sequential (or informational) cohesion wherein the output from one element in the module serves as the input for some other element.
 - (g) Functional cohesion wherein each part of the module is necessary for the execution of a single function.
- (2) Coupling refers to the interdependence of modules (i.e., how they communicate with each other). Of the six types of coupling, modules shall strive to employ data coupling wherever possible. The types of module coupling (in order of increasing desirability) are:
- (a) Content coupling
 - (b) Common coupling
 - (c) External coupling
 - (d) Control coupling
 - (e) Stamp coupling
 - (f) Data coupling.
- (3) Complexity refers to the logical or control flow complexity of any given module. Modules shall be designed with low complexity since they will be easier to test and maintain:
- (a) The cyclomatic complexity of a module shall be kept within 10 as determined by McCabe's Cyclomatic Complexity Metric.
 - (b) The size of any module shall be no more than 200 lines of executable code.
- (4) Structure refers to whether or not a program is structured. Modules shall be designed in a structured manner to enhance maintainability as determined by the principles of essential complexity and program "knots":

- (a) The essential complexity of a module shall be 1.
- (b) Modules shall have 0 "knots." Knots are those places in a program where one control path crosses another.
- e. The software shall be self-descriptive. The software must contain sufficient comments to provide explanation of the implementation of a function.
- f. The software shall be traceable. The functionality of the system must possess a clear linkage from the requirements to the implementation with respect to the specific development and operational environment.

3.11.6 Testability Requirements. The requirements contained in this section specify the effort required to test the system to ensure that it performs its intended function. The testability requirements are:

- a. The software shall be simplistic. The functions of the system must be implemented in a most understandable manner and avoid those coding/implementation practices that increase complexity.
- b. The software shall be modular. The system must satisfy the requirements of modularity specified in section 3.11.5 above.
- c. The software shall support instrumentation. All paths must be testable and all input parameters must be boundary testable.
- d. The software shall be self-descriptive. The software must contain sufficient comments to provide explanation of the implementation of a function.

3.11.7 Flexibility Requirement. The requirements contained in this section specify the effort required to modify operational software. The flexibility requirements are:

- a. The software shall be modular. The system must satisfy the requirements of modularity specified in section 3.11.5 above.

- b. The software shall be general. The software should not have input, processing, and output processing mixed in the same modules; all constants should be defined only once; and application and machine-dependent functions should not be mixed in the same modules.
- c. The software shall be expandable. The system must perform logical processing independent of data storage specifications (not commit all available memory capacity) and be extensible in terms of computational functions.
- d. The software shall be self-descriptive. The software must contain sufficient comments to provide explanation of the implementation of a function.

3.11.8 Portability Requirements. The requirements contained in this section specify the effort required to transfer the system from one hardware configuration and/or software system environment to another. The portability requirements are:

- a. The software shall be modular. The system must satisfy the requirements of modularity specified in section 3.11.5 above.
- b. The software shall be self-descriptive. The software must contain sufficient comments to provide explanation of the implementation of a function.
- c. The software shall be machine-independent. The code used should be independent of word and character size and the data representation should also be machine independent. Wherever possible, modules should be free of input/output references. If at all possible, there should be no operating system references.
- d. The software shall be as software system-independent as possible. The system shall utilize ANSI Standard C and should limit dependence on software system utilities and software system library routines wherever possible.

3.11.9 Reusability Requirement. The requirements contained in this section specify the extent to which SORTS modules can be used in other applications (related to the packaging and scope of the functions that the modules perform). The reusability requirements are:

- a. The software shall be general. The software should not have input, processing, and output functions mixed in the same modules; all constants should be defined only once; and application and machine-dependent functions should not be mixed in the same modules.
- b. The software shall be modular. The system must satisfy the requirements of modularity specified in section 3.11.6 above.
- c. The software shall be as software system-independent as possible. The system shall utilize ANSI Standard C and should limit dependence on software system utilities and software system library routines wherever possible.
- d. The software shall be machine-independent. The code used should be independent of word and character size and data representation should also be machine-independent. Wherever possible, modules should be free of input/output references.
- e. The software shall be self-descriptive. The software must contain sufficient comments to provide explanation of the implementation of a function.

3.11.10 Interoperability Requirement. The requirements contained in this section specify the effort required to allow SORTS to exchange information with another system to enable them both to operate effectively together. The interoperability requirements are:

- a. The software shall be modular. The system must satisfy the requirements of modularity specified in section 3.11.5 above.
- b. The software shall utilize communications commonality wherever appropriate. It is recognized that this requirement will be satisfied primarily by the Application and Internal Interfaces.
- c. The software shall utilize data commonality. The system should use a single module to perform any data translations and standard data representations should be used.

3.12 Design and Implementation Constraints (REQ-10)

SORTS is intended to operate in multiple environments utilizing client/server architecture and standalone workstations. This concept allows the software functions to be distributed optimally among client servers, data servers, and workstations. As a result, the following considerations may impact or somewhat limit the use of certain design and implementation options for SORTS:

- a. The SORTS shall be designed in such a way as to allow for implementation and operation in either a stand-alone or client/server architecture.
- b. The SORTS shall be developed utilizing the programming language, operating software, and database software as defined in section 3.10.
- c. Implementation and operation of the SORTS shall be limited to the Government selected and furnished equipment as defined in section 3.10.
- d. The SORTS shall be developed in accordance with the standards identified in the current Software Standards and Procedures Manual (SSPM).
- e. Design of the SORTS database, data elements, and data editing and updating must meet the requirements and definitions for SORTS data as defined in Joint Pub 1-03.3.
- f. Data input and output functions of the SORTS shall be designed as to accept, edit, and output USMTF formatted messages.
- g. The design of the SORTS shall provide full duplex connectivity for data transport to and from the AMHS.

3.13 Personnel-Related Requirements (REQ-11)

It is required that all users and operational support personnel have a working knowledge of the types and usage of data available through the SORTS database. This knowledge is essential to properly structure queries and produce meaningful reports.

Personnel requirements in this specification are classified in two areas: Operational Support and Users. The following sections discuss requirements for each group.

3.13.1 Operational Support. Operational Support personnel are required to have experience in or working knowledge of the following hardware, software and programming languages:

a. Hardware:

- (1) Sun SPARC 690/1000 servers
- (2) WIS Workstations
- (3) Sun SPARC 5/20 Workstations
- (4) WIS CUC PCs
- (5) MS-DOS Compatible PC
- (6) MUXs/Routers/Transceivers.

b. Software:

- (1) Unix Operating Systems
 - (a) A/UX
 - (b) Solaris
 - (c) SCO
- (2) Transmission Control Protocol/Internet Protocol (TCP/IP) Network Communications Software
- (3) X-Window Systems
- (4) Oracle Relational Database Manager
- (5) Oracle/Oracle Tools
- (6) MS-DOS
- (7) WordPerfect 5.2
- (8) SORTS Communication Processor (SCP)
- (9) AMHS profiles
- (10) NACE

- (11) GCCS COE
- (12) ACP/JANAP formats
- (13) USMTF formats.

c. Programming languages:

- (1) SQL*Plus
- (2) Unix shell scripts
- (3) Motif
- (4) ANSI/ISO C.

3.13.2 Users. Primarily, there are two types of SORTS users, the *End User* and the *Data Provider*. *End Users* operate from the prospective of obtaining data from the SORTS database via queries. *Data Providers* focus on gathering information from their theater of operation and forwarding that information to the SORTS database via AUTODIN message transactions.

3.13.2.1 End Users. The *End User* can obtain information from the SORTS database by means of SQL queries. The level of computer knowledge may differ among *End Users*, however experience in or working knowledge of any of the following areas will prove most useful:

- a. Hardware (servers, workstations, and printers)
- b. Unix Operating Systems (Solaris and Apple/Unix (A/UX))
- c. Programming Languages (Oracle SQL*Plus)
- d. Training and/or Knowledge:
 - (1) SORTS database knowledge
 - (2) GCCS COE
 - (3) GCCS application training
 - (4) Window-based applications.

3.13.2.2 Data Providers. A *Data Provider* is anyone who is responsible for formulating and/or releasing a message for transmittal. The theater of operation for the *Data Provider* may be a Major Command, Service Headquarters or a unit. The *Data Provider* submits military unit data to SORTS in United States Message Text Format (USMTF) via AUTODIN, AUTOVON, or file transfer. Training may vary within each branch of the military, but it essential that the messages be formatted properly and transmitted error-free. Data Providers require instruction in the following areas:

- a. USMTF
- b. ACP/JANAP
- c. Operation manual for message transactions
- d. SORTS v6.0 Data Handlers Course (taught by AETC).

3.14 Training-Related Requirements (REQ-12)

SORTS is dynamic system that undergoes periodic change for the enhancement of the overall system. Training courses are routinely reviewed to ensure efficiency of the SORTS personnel. Currently the following SORTS training is available:

- a. SORTS 6.0 Data Handlers Course (7 Day Course):
 - (1) USAF:
 - (a) Keesler AFB: E-4ACRT-1C351-000
 - (b) MTT: E-4AST-1C351-000.
 - (2) USMC:
 - (a) Keesler AFB: E-4ACRT-1C351-001
 - (b) MTT: E-4AST-1C351-001.
 - (3) USA:
 - (a) Keesler AFB: E-4ACRT-1C351-002
 - (b) MTT: E-4AST-1C351-002.
 - (4) USANG:

(a) Keesler AFB: E-4ACRT-1C351-006

(b) MTT: E-4AST-1C351-006.

b. GCCS Training Plan:

(1) Unix (3 Day Course):

(a) Keesler AFB: E-3OAR-33S3C-017

(b) OSF: E-3OAP-33S3C-019

(c) MTT: E-4OST-33S3C-082.

(2) Oracle (5 Day Course):

(a) Keesler AFB: E-3OAR-33S3C-015

(b) OSF: E-3OAP-33S3C-004

(c) MTT: E-4OST-33S3C-070.

(3) GCCS Action and Planning Staff Orientation (1-5 Day Course):

(a) Keesler AFB: E-3OAR-33S0-003

(b) OSF: E-3OAP-33S0-003

(c) MTT: E-4OST-33S0-003.

c. GCCS Interactive Courseware (ICW):

(1) WWMCCS Terminal User (Course ID: TUC)

(2) Honeywell Level 6 Operator (Course ID: LV6)

(3) Introduction to WIS Workstation (Course ID: COT).

3.15 Logistics-Related Requirements (REQ-13)

Logistical concerns such as transportation, software support, system maintenance, supply, and impact on existing facilities include those requirements as listed below and may be further defined by existing and future policies and procedures in effect at individual SORTS sites and installations.

- a. System maintenance: Access to a C2 certified computer operations area in accordance with requirements specified in section 3.8 for developmental and operational support.
- b. Software support: May have to travel to SORTS and or GCCS sites to assist in the installation of software and system configuration.
- c. Transportation: Software may be transported by US Mail, Courier services, Electronic means (i.e., file transfer), or FedEx.
- d. Supply requirements: Purchase of tapes (8 mm, 4 mm, 150 MB), printer paper, and general office supplies as required.
- e. Impact on facilities: For operational and developmental sites, impact on existing facilities are inclusive of those as stated in section 3.8.

3.16 Other Requirements

There are no additional requirements for the SORTS software.

3.17 Packaging Requirements (REQ-14)

A SORTS software release shall consist of complete subsystems into an operational system along with any implemented engineering changes. The preparation of the system for delivery is specified in the Software Product Specification (SPS 2-95), Section 3.3, Packaging Requirements.

Documentation to be delivered with the system shall include the Software Development Folders (SDFs) for each subsystem, a Software Version Description (SVD), and Software Product Specification (SPS).

The release media is UNCLASSIFIED and shall be accompanied by a delivery letter.

3.18 Precedence and Criticality of Requirements (REQ-15)

Except when indicated, all requirements in this specification, for all intents and purposes, are equally weighted in terms of precedence and criticality.

The external interface requirement specifications have been assigned a priority indicator value that ranges from '1' to '5'; '1' denotes the highest priority. Priorities are assigned in consideration of the level of impact that the interface has on the accomplishment of the functional requirements and objectives of the SORTS software. Priority assignments are subject to change throughout the software life cycle.

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SECTION 4. QUALIFICATION PROVISIONS

This section specifies the qualification methods to be used to ensure that SORTS requirements have been satisfied. Qualification methods discussed in this section are used to ensure that all SORTS requirements (as specified in Section 3) have been fulfilled. The qualification cross-reference appears as Table 4-1. These methods are described as follows:

- a. Demonstration - the use of stubs and drivers to permit the functional operation of specific program unit(s) to ensure that the function to be performed is done so correctly.
- b. Test - the execution of specific program unit(s) utilizing test data to ensure that the algorithmic logic performs correctly, in accordance with established test procedures.
- c. Analysis - the verification and interpretation of the results obtained from the various qualification methods described in this section whereby the Quality Control (QC) Team (in conjunction with the Project Manager) can analyze the accumulated results to ensure that quality assurance standards are maintained.
- d. Inspection - the visual review of source code and documentation to ensure that both coding standards and documentation guidelines are followed.
- e. Reviews - the use of peer reviews during software development and formal reviews (in accordance with MIL-STD-1521B), as applicable to ensure that software development fulfills the defined requirements.

Table 4-1. Qualification Methods

Requirement Name	Project Unique Identifier	Section 3 Reference	Qualification Methods	Qualification Levels
GUI Capability Requirements	CAP-1.01	3.2.1.1	Demonstration, Test, Analysis, Inspection and Reviews	CSU, CSC
GIQS and SIQS Capability Requirements	CAP-1.02	3.2.1.2	Test, Analysis, and Reviews	CSU, CSC
Database Organization	CAP-2.01	3.2.2.1	Test, Analysis, and Reviews	CSU, CSC
Database Initialization	CAP-2.02	3.2.2.2	Test, Analysis, and Reviews	CSU, CSC
Input Data Preparation	CAP-2.03	3.2.2.3	Test, Analysis, and Reviews	CSU, CSC
Update Preprocessing	CAP-2.04	3.2.2.4	Test, Analysis, and Reviews	CSU, CSC
Update Processing	CAP-2.05	3.2.2.5	Test, Analysis, and Reviews	CSU, CSC
RAMP	CAP-2.06	3.2.2.6	Test, Analysis, and Reviews	CSU, CSC
JOPES	CAP-3.01	3.2.3.1	Test, Analysis and Reviews	CSU, CSC
FAPES	CAP-3.02	3.2.3.2	Test, Analysis, and Reviews	CSU, CSC
NCCS	CAP-3.03	3.2.3.3	Analysis and Reviews	CSU, CSC
JMCIS	CAP-3.04	3.2.3.4	Test, Analysis, and Reviews	CSU, CSC
DMDC	CAP-3.05	3.2.3.5	Test, Analysis, and Reviews	CSU, CSC
AMHS	CAP-3.06	3.2.3.6	Test, Analysis, and Reviews	CSU, CSC
NACE	CAP-3.07	3.2.3.7	Test, Analysis, and Reviews	CSU, CSC
JSC	CAP-3.08	3.2.3.8	Test, Analysis, and Reviews	CSU, CSC

Table 4-1. Qualification Methods

Requirement Name	Project Unique Identifier	Section 3 Reference	Qualification Methods	Qualification Levels
System Utilities	CAP-4.00	3.2.4	Test, Analysis, and Reviews	CSU, CSC

SECTION 5. REQUIREMENTS TRACEABILITY

Table 5-1 provides a correlation for all subsystem capabilities expressed in this SRS to their respective system requirements, if any, that they address.

Table 5-1. Requirements Traceability

Subsystem Name	Requirement Name	Project Unique Identifier	Section 3 Reference	Traceability Reference
User Interface	GUI Capability Requirements	CAP-1.01	3.2.1.1	FD (Section 3.3.2.1)
User Interface	GIQS/SIQS Capability Requirements	CAP-1.02	3.2.1.2	JS Pub 1-03.3 (Chap I, Sect A, Para 3.a.(1)(c))
Database Processing	Database Organization	CAP-2.01	3.2.2.1	JS Pub 1-03.3 (Chap I, Sect A, Para 3.a.(1)(b))
Database Processing	Database Initialization	CAP-2.02	3.2.2.2	CJCS MOP-11 (Para 5, Appendix)
Database Processing	Input Data Preparation	CAP-2.03	3.2.2.3	FD (Section 4.1.1.1)
Database Processing	Update Preprocessing	CAP-2.04	3.2.2.4	JS Pub 1-03.3 (Chap I, Sect A, Para 3.b)
Database Processing	Update Processing	CAP-2.05	3.2.2.5	JS Pub 1-03.3 (Chap III)
Database Processing	RAMP	CAP-2.06	3.2.2.6	JS Pub 6-04 Series ((20, 23, 31, 32, 41-45)
Application Interfaces	JOPEs	CAP-3.01	3.2.3.1	JS Pub 1-03.3 (Chap I, Sect A, Para 3.c.(4)(a))
Application Interfaces	FAPES	CAP-3.02	3.2.3.2	JS Pub 1-03.3 (Chap I, Sect A, Para 3.c.(4)(b))
Application Interfaces	NCCS	CAP-3.03	3.2.3.3	JS Pub 1-03.3 (Chap I, Sect A, Para 3.c.(4)(d))
Application Interfaces	JMCIS	CAP-3.04	3.2.3.4	SORTS Legacy
Application Interfaces	DMDC	CAP-3.05	3.2.3.5	SORTS Legacy
Application Interfaces	AMHS	CAP-3.06	3.2.3.6	JS Pub 1-03.3 (Chap I, Sect A, Para 3.b)
Application Interfaces	NACE	CAP-3.07	3.2.3.7	JS Pub 1-03.3 (Chap I, Sect A, Para 3.b)
Application Interfaces	JSC	CAP-3.08	3.2.3.8	SORTS Legacy
System Utilities	System Utilities	CAP-4.00	3.2.4	FD (Section 4.2.1.7)

SECTION 6. NOTES

6.1 Notes

The requirements presented in this SRS have been labelled with a SORTS project unique identifier (PUI). The PUI utilized in this document, formulated as "XXX-N.YYY", is interpreted as follows:

- a. "XXX" is used to indicate a functional or related group of requirements, "XXX" is defined as follows:

REQ	Requirement
CAP	Capability
RIN	Internal Interface
INT	External Interface
DAT	Internal Data Requirements

- b. "N" indicates the SORTS subsystem that the stated requirement is associated with. "N" is defined as follows:

1	User Interface
2	Database Processing
3	Application Interfaces
4	System Utilities

- c. "YYY" is a sequential numbering of requirements that have been mapped to a SORTS subsystem, beginning with '001'. Use of this sequential number is only used when more than one requirement exists in a particular group, for the same referenced subsystem.

6.2 Terms and Abbreviations

The following list of terms, acronyms, and abbreviations used in this SRS are defined as follows:

ABF	Aaron B. Floyd Enterprises, Inc.
ADP	Automated Data Processing
ADPLO	Automated Data Processing Liaison Officer
ADRG	Arc Digital Raster Graphic
AI	Applications Interface

AMHS	Automated Message Handling System
API	Application Programming Interface
ASB	Applications Software Bulletin
ASCII	American Standard Code for Information Interchange
ASD(C ³ I)	Assistant Secretary of Defense Command, Control, Communications, and Intelligence (Office of)
A/UX	Apple/Unix
AUTODIN	Automated Digital Network
BIDE	Basic Identity Information
CD-ROM	Compact Disc-Read Only Memory
CIA	Central Intelligence Agency
CINC	Commander-in-Chief
CJCS	Chairman of the Joint Chiefs of Staff
CM	Configuration Management
CMAS	Crisis Management ADP System
CMMH	Command/Monitor/Manage/Help
COE	Common Operating Environment
COMM	Communications
COTS	Commercial Off-the-shelf
CSCI	Computer Software Configuration Item
CSOM	Computer System Operator's Manual
DBA	Database Administrator
DBP	Database Processing
DISA	Defense Information Support Agency

DID	Data Item Description
DMA	Defense Mapping Agency
DMDC	Defense Manpower Data Center
DoD	Department of Defense
DOS	Disk Operating System
DPS8	Data Processing System 8
DPS8000	Data Processing System 8000
DSA	Distributed Systems Architecture
DSSO	Defense Systems Support Organization
ECAC	Electronic Compatible Analysis Center (presently known as Joint Spectrum Center)
ETC	Enhanced Terminal Capability
FAPES	Force Augmentation Planning and Execution System
FD	Functional Description
FQT	Formal Qualification Testing
FRAS	Force Resources Assessment Subsystem
GCCS	Global Command and Control System
GCOS	General Comprehensive Operating System; the operating system for DPS8 and DPS8000 computers
GEO	Geographic Location
GIQS	General Intelligent Query System
GOTS	Government Off-the-shelf
GSORTS	Global Command and Control System Status of Resources and Training System
GSPR	Global System Problem Reports

GUI	Graphical User Interface
IAW	In Accordance With
IP	Implementation Procedures
JCS	Joint Chiefs of Staff
JDSSC	Joint Data Systems Support Center
JEXA	Software Applications & Data Structure Department
JEXG Branch)	SORTS Engineering Branch (formerly Resource Monitoring Branch)
JIEO	Joint Interoperability and Engineering Organization
JISC	Joint Information Service Center
JMCIS	Joint Maritime Command Information System
JOPES	Joint Operations Planning and Execution System
JOTS	Joint Operations Tactical System
JPL	Jet Propulsion Laboratory
JS	Joint Staff
JVIDS	Joint Visually Integrated Display System
JUH	Joint User Handbook
MB	Megabytes
MEQPT	Major Equipment
MIL-STD	Military Standards
MTF	Message Text Format
MWS	Mapping Workstation System
NACE	NMCS Automated Control Executive
NICE	NACE Interface and Connectivity Environment

NCA	National Command Authorities
NMCC	National Military Command Center
NMCS	National Military Command System
OIF	Operator Interface Function
OM	Operation Manual
OSD	Office of the Secretary of Defense
OTH	Over the Horizon
PC	Personal Computer
PM	Procedures Manual
PUB	Joint Publication
PUI	Project Unique Identifier
RAM	Random Access Memory
RAMP	Report and Message Processor
RDBMS	Relational Data Base Management System
SA	System Administrator
SDF	Software Development Folder
SCP	SORTS Communications Processor
SIPRNET	Secret Internet Protocol Router Network
SIQS	SORTS Intelligent Query System
SM	SORTS Manager
SOP	Standard Operating Procedures
SORTS	Status of Resources and Training System
SPARC	SUN Scalable Processor Architecture

SPM	System Planning Manual
SQL	Structured Query Language
SRS	Software Requirement Specification
SS	System Specification
SSDD	System/Segment Design Document
SU	System Utilities
TCP/IP	Transmission Control Protocol/Internet Protocol
TUCHA	Type Unit Characteristics
TM	Technical Memorandum
UI	User Interface
UIC	Unit Identification Code
UM	Users Manual
USAF	United States Air Force
USMTF	United States Message Text Format
USN	United States Navy
VDD	Version Description Document
WIN	WWMCCS Intercomputer Network
WIS	WWMCCS Information System
WWMCCS	Worldwide Military Command and Control System
WWS	WIS Workstation
XSM	X-Windows SORTS Manager